

UNCLASSIFIED

AD NUMBER	
AD500417	
CLASSIFICATION CHANGES	
TO:	UNCLASSIFIED
FROM:	SECRET
LIMITATION CHANGES	
TO: Approved for public release; distribution is unlimited.	
FROM: Distribution authorized to U.S. Gov't. agencies only; Administrative/Operational Use; MAR 1969. Other requests shall be referred to Defense Advanced Research Projects Agency, Arlington, VA 22203.	
AUTHORITY	
DARPA ltr 2 Jul 1975; DARPA ltr 2 Jul 1975	

THIS PAGE IS UNCLASSIFIED

UNCLASSIFIED

AD. 500 417

CLASSIFICATION CHANGED
TO: UNCLASSIFIED
FROM: SECRET
AUTHORITY:

DARPA Ltr. 2 July 75



UNCLASSIFIED

THIS REPORT HAS BEEN DELIMITED
AND CLEARED FOR PUBLIC RELEASE
UNDER DOD DIRECTIVE 5200.20 AND
NO RESTRICTIONS ARE IMPOSED UPON
ITS USE AND DISCLOSURE.

DISTRIBUTION STATEMENT A

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED.

SECURITY

MARKING

The classified or limited status of this report applies to each page, unless otherwise marked.

Separate page printouts MUST be marked accordingly.

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U.S.C., SECTIONS 793 AND 794. THE TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U.S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

Secret



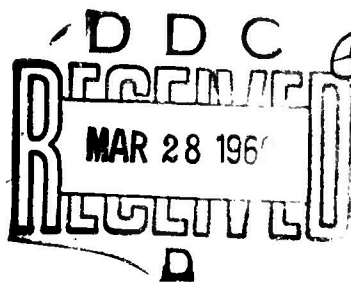
**ADVANCED
RESEARCH
PROJECTS
AGENCY**

**PROJECT
AGILE**

AD 500417



**RACIC
report**



Secret

SECRET/NOFORN

BCL Document Control No. D6902182-9

**ADVANCED
RESEARCH
PROJECTS
AGENCY**

**PROJECT
AGILE**

GROUP 1

Excluded from automatic downgrading
and declassification

WARNING

THIS MATERIAL CONTAINS INFORMATION AFFECTING
THE NATIONAL DEFENSE OF THE UNITED STATES
WITHIN THE MEANING OF THE ESPIONAGE LAWS.
TITLE 18, U.S.C., SECTION 793 AND 794, AS AMENDED.
ITS TRANSMISSION OR THE REVELATION OF ITS CON-
TENTS, IN ANY MANNER TO AN UNAUTHORIZED
PERSON, IS PROHIBITED BY LAW.

In addition to security requirements which apply
to the document and must be met, each transmittal
outside the agencies of the U. S. Government
must have prior approval of ARPA/TIO.

WASH DC 20301

15 FEB 1969 14-C-0110

NOFORN



RIVERINE/INSHORE WARFARE (U)
(A Selected, Annotated Bibliography) (U)

14 RACIC-MR-2

11 March 1969

by

William C. Patterson, Jr.

RACIC

Battelle Memorial Institute
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

EXCLUDED FROM AUTOMATIC
REGRADING; DOD DIR 5200.10
DOES NOT APPLY

SECRET/NOFORN

**RACIC
report**

SECRET/NOFORN

Battelle Memorial Institute • COLUMBUS LABORATORIES

505 KING AVENUE COLUMBUS, OHIO 43201 • AFEA CODE 614, TELEPHONE 299-3151 • CABLE ADDRESS: BATMIN

March 21, 1969

When separated from inclosures, handle
this document as Unclassified.

Director
Advanced Research Projects Agency
Office of the Secretary of Defense
Washington, D. C. 20301

Attention Project AGILE

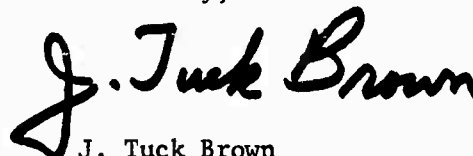
Dear Sir:

Enclosed is a copy of our report, "Riverine/Inshore Warfare (U)" (A
Selected, Annotated Bibliography), RACIC-MR-2.

This memorandum report is one of a series of bibliography-type reports
which are being prepared by members of the RACIC staff from information which
has been collected in the preparation of replies to quick-response inquiries and
in the performance of other RACIC tasks. It is hoped that such bibliographies
will provide those working in specific areas of interest, such as riverine
warfare, with ready reference to documents and sources of information.

We will welcome any comments you may have in regard to this report.

Sincerely,



J. Tuck Brown
Project Director
RACIC

JTB:ned

Enc.

cc: See Distribution List

Document transmitted
herewith contains
Defense Information

DDC CONTROL
NO. ~~93900~~

93900

SECRET/NOFORN

UNCLASSIFIED SECRET

PREFACE

This research was supported by the Advanced Research Projects Agency of the Department of Defense and was monitored by ARPA/AGILE under Contract No. F33657-67-C-0810.

SECRET

REF CONTROL
NO. 33900

UNCLASSIFIED

UNCLASSIFIED

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION.	iii
SECTION I: GENERAL.	I-1
SECTION II: SOME HISTORICAL ASPECTS OF RIVERINE/INSHORE WARFARE. .	II-1
SECTION III: THE RIVERINE ENVIRONMENT	III-1
SECTION IV: MINE WARFARE IN INLAND/INSHORE WATERS.	IV-1
SECTION V: INSHORE OPERATIONS	V-1
SECTION VI: JUNKS AND SAMPANS.	VI-1
SECTION VII: SMALL CRAFT (WESTERN TYPES).	VII-1
SECTION VIII: SWIMMER ATTACKS.	VIII-1
SECTION IX: SHALLOW WATER SONAR AND ACOUSTICS.	IX-1

UNCLASSIFIED

RIVERINE/INSHORE WARFARE (U)
(A Selected, Annotated Bibliography)

by

William C. Patterson, Jr.

INTRODUCTION

(U) Since its inception, RACIC has accumulated a considerable amount of information concerning riverine/inshore warfare. Much interest in this type of information has been demonstrated by the large number of requests for bibliographies, of people visiting RACIC seeking such information, and of the queries received (and answered). In view of this strong interest, it was concluded that a comprehensive bibliography covering not only riverine/inshore warfare but also peripheral subjects would be a very desirable product, of use to a large number of regular users of RACIC's services. Accordingly, this selected, annotated bibliography has been prepared. It is called "selected" because only items considered to be of real value in the various subject areas have been selected for inclusion.

(U) The annotations are, for the most part, extracts from the documents themselves. By annotating in this fashion, it is hoped that the contents and usefulness of any individual document will be better conveyed to the reader. In some cases annotations are not given; these cases occur in Section II, the historical section. This is because the documents were not readily available or were in a foreign language, or both. These documents have been recommended to RACIC as being quite worthwhile by sources whose judgment is trusted; they have, therefore, been included in the hope that they will be of value to users.

(U) Since there are 277 citations, it was considered desirable that the bibliography be divided into more manageable groupings; thus, there are nine sections. The largest single grouping, Section VII, contains 92 items.

(U) It should be noted that many citations appear in more than one section. This is because information on a number of interrelated but different subjects will often appear in one document. In such cases, the entry has been placed in each of the appropriate sections but the annotation appears only with

UNCLASSIFIED

the citation under the single section judged to be most appropriate. When an unannotated item appears, the section and item number in which the annotation can be located are given.

(U) Most entries contain a "PA" number. This number is the RACIC acquisition number, by which all RACIC file entries are identified. Where it is known to RACIC, we have also given the "AD" number - the Defense Documentation Center (DDC) acquisition number.

(U) RACIC is forbidden to make secondary distribution of documents. Therefore, documents listed in this bibliography are not available, even on loan, from RACIC. Qualified users may visit RACIC and study these documents. Documents with an AD number are, of course, available from DDC. Most other documents are available from their originator or from the agency for whom the report was prepared.

(U) There are two deliberate omissions from this bibliography: (1) Between 1952 and 1962, the Naval Research Laboratory published a series of 14 "Harbor Defense and Countermeasures Bulletins". These are omitted because the information in them is generally outdated. All are available from DDC for persons interested. (2) For a number of years the Defense Research Laboratory has had a continuing contract with the Office of Naval Research, which has involved many types of research in acoustics/underwater sound and related topics of interest. Since they report their progress quarterly, all such reports are omitted from this selection, simply because of their large number. Non-periodic reports, such as project completions and special reports, have been included where appropriate and where available.

SECRET/NOFORN

SECTION I

GENERAL (U)

SECRET/NOFORN

SECRET

SECTION I

GENERAL (U)

- (I-1) Johnson, James W., "River and Canal Ambush Problems, Republic of Vietnam, 1962 (U)", Report No. RAC-SP-4(SEA) (AD 337 811 L), from Research Analysis Corporation, McLean, Virginia, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. DA-44-188-ARO-1 (April 1963), 57 pp (SECRET) (PA 149)*.

(S) This study was designed:

"To establish the relative importance of the past and possible future river and canal ambushes as employed by the Viet Cong guerrillas against the Republic of Vietnam armed forces.

"To examine the guerrilla tactics and techniques in river and canal ambushes, and current countermeasures employed.

"To examine and propose possible tactical and technical countermeasure improvements, and possible research and development action to permit such improvements."

- (I-2) Wise, W. F., "The Vulnerability of Landing Craft to Small Ground Mines (U)", Report No. UERD-2-59 (AD 308 982), from Norfolk Naval Shipyard, Underwater Explosions Research Division, Portsmouth, Virginia, for Department of the Navy, Washington, D. C. (April 1959), 98 pp (CONFIDENTIAL) (PA 5206).

(C) "The objectives of this study were to determine the vulnerability of landing craft to shallow water mines employing different charge weights of interest to the U. S. Army at water depths for which the U. S. Army is cognizant, and to obtain shock inputs for machinery and equipment on the landing craft during such ground mine explosions."

- (I-3) Dosien, R. W., and Thornton, R. M., "Firepower Requirements for Remote Area Combat Logistical Capability in Remote Area Combat. Volume IV: Logistics Capability in Remote Area Combat (U)", Final Report (AD 351 513), from Applied Science Corporation, Santa Paula, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. OSD-SD-128, ARPA Order No. 324 (March 1963) (SECRET) (PA 5287).

(U) This report describes the inland waterway system of the RVN. It also has figures showing numbers and types of boats available to the RVN forces as well as to the VC.

*PA numbers identify entries in the RACIC files.

SECRET

(This page is Confidential)

- (I-4) Bottoms, Albert M., "A Survey of River Minecountermeasures for Use in Remote Area Conflict, A Preliminary Report (U)", Research Analysis Corporation, for the Advanced Research Projects Agency, Office of Secretary of Defense, Contract No. SD-212, ARPA Cont. No. 10020, RAC 63-2791 (November 15, 1963) (SECRET) (PA 5434).

(U) This study describes the problem of river mines and offers some possible solutions. The study is rather dated in places, but much of it is still useful.

- (I-5) "Tactics and Techniques of Counterinsurgent Operations (U)", from Chief, Military Aid and Assistance Group-Vietnam (July 1, 1963) (CONFIDENTIAL/NOFORN except Republic of Vietnam and Australian Army Training Team, Vietnam) (PA 5812).

(U) This manual contains sections describing riverine operations, tactics and techniques. There are also brief descriptions of the environment of the RVN south of Saigon.

- (I-6) Daly, E. F., "Report on Trip to South Vietnam (U)", from U. S. Naval Explosive Ordnance Depot Facility, U. S. Naval Propellant Plant, Indian Head, Maryland, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (March 23, 1964) (CONFIDENTIAL) (PA 6820).

(U) This trip report describes types of water mines used by the VC, tactics of ambushes, and possible countermeasures.

- (I-7) Raring, G. L., "Riverine Warfare - An Appraisal and Concept of Operations (U)", from Research Analysis Corporation, Foreign Operations Office, McLean, Virginia (February 3, 1964) (CONFIDENTIAL) (PA 5941).

(U) The purpose of this study was to "appraise the potential of riverine warfare in remote area conflict, develop a concept of operations and derive therefrom...weapons systems requirements."

- (I-8) Bottoms, A. M., and Seawright, J. W., "Riverine Mine Countermeasures in Vietnam - 1964 (U)", Report No. E-80, from Joint Advanced Research Projects Agency/Navy Mobile Technical Analysis Team (MCM), and Research Analysis Corporation, McLean, Virginia, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-212 (April 15, 1964) (CONFIDENTIAL) (PA 7742).

(C) "This report summarizes the river and canal incidents, discusses the material threat - the types of mines employed by the Viet Cong, and the operational environment in which riverine minecountermeasures are conducted. The present equipment employed by the Vietnamese Navy for mechanical sweeping of the mines is discussed and some suggestions for field expedient improvements for mechanical minesweeping are made. Following

I-2
SECRET

SECRET/NOFORN

- (I-8) (Cont'd) (C) the discussion of mechanical minesweeping techniques, the tests and results obtained with the AN/PQS-1B hand-held sonar are described. Part I of the report concludes with some comments on Viet Cong counter countermeasures and on alternative approaches. Part II of this report presents an R&D program for Riverine Minecountermeasures.

(C) " Appendix A describes the organization and equipment that the Vietnamese Navy employs in Riverine Warfare. Appendices B and C present riverine incident lists. Appendix D outlines the kind of information desired in the reports of riverine incidents. Appendix E presents detailed data on the canal system shown in Fig. 1. Field expedient improvements to present mechanical minesweeping capabilities are given in Appendix F, and Appendix G provides some suggestions for the operational evaluation of proposed improvements to both minesweeping and mine detection technique."

- (I-9) "Analysis of Geographic and Climatic Factors in Coastal Southeast Asia", Final Report No. 04231-1-F (AD 275 476), from The University of Michigan, College of Literature, Science, and the Arts, Department of Geography, Ann Arbor, Michigan, for Quartermaster Research and Development Command, Environmental Protection Research Division, Natick, Massachusetts, Contract No. DA-19-129-QM-1655 (March 1962) (UNCLASSIFIED) (PA 8530).

(U) This study describes the geography and climate of SEA to a depth of approximately 50 miles inland. It provides useful general information on the environment in which inshore operations are conducted.

- (I-10) Lubnow, H. A., "Acoustical Surveillance System for Riverine Operations...(C)", from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Bureau of Ships, Washington, D. C. (September 4, 1964) (CONFIDENTIAL) (PA 9295).

(C) This document describes tests of two pieces of equipment attempting to detect the underwater sound of both inboard and outboard motorboats.

- (I-11) Gray, R. T., et al., "Revolutionary Warfare on Inland Waterways: An Exploratory Analysis (U)", Report No. NAVWEPS-8679, and NO1S-TP-3733 (AD 357 903), from U. S. Naval Ordnance Test Station, China Lake, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., and Department of the Navy, Bureau of Naval Weapons, Washington, D. C. (January 1965), 338 pp (SECRET/NOFORN) (PA 14,695).

(S/NF) "Revolutionary-warfare inland-waterway operations are analyzed and weapon-system research and development needs derived. Inventory and state-of-technology weapon systems and concepts are selectively analyzed independently and on a comparative basis. Missions, the physical environment, watercraft, and weapons are discussed as major subjects in detail. The potentially high significance of missions and the need to develop a set of several

SECRET/NOFORN

(I-11) (Cont'd) (S/NF) watercraft and several weapons for such watercraft are described. Specific research and development effort is recommended to establish future capabilities and remedial action suggested to aid in the solution of pressing current problems."

(I-12) "Development Status of Military Counterinsurgency Programs, Including Counterguerrilla Forces as of 1 February 1965 (U)", from The Joint Chiefs of Staff, Washington, D. C. (March 16, 1965) (SECRET/NOFORN) (PA 15,848).

(U) "This document...is to provide, for ready reference, a comprehensive summary of background information on all military counterinsurgency programs and activities. Its content is derived from reports received from the Services, commanders of unified commands and submissions from the Defense Intelligence Agency..."

(I-13) Michels, Frederick H., "Underwater Acoustic Detection of Outboard Motors (U)", Interim Report No. NAVEODFAC 130 (October 28, 1964 - January 21, 1965) (AD 356 436 L), from U. S. Naval Explosive Ordnance Disposal Facility, Indian Head, Maryland, for Department of the Navy, Bureau of Naval Weapons, Washington, D. C. (January 21, 1965) (CONFIDENTIAL) (PA 17,532).

(C) "The...Swimmer Acoustic Test Set (SATS), Mk 16 Receiver, and MDL Marker Receiver were tested to determine their capabilities in the detection of small craft equipped with outboard motors. Tests were conducted at four motor speeds. The tests were conducted in the Potomac River near Indian Head, Maryland and in the confined waters of Chicamuxen Creek, located in the same general area. Test depths varied from 3-1/2 feet to 27 feet and water surface conditions ranged from calm to 2-1/2 foot waves. Surface disturbances affect the capabilities of all three sets. Detection of small craft from cavitation noise is impossible when large objects or a land mass block a direct path between the noise source and the instrument being used for detection."

(I-14) Thompson, T. R., "Combat Operations After Action Report and Report on Ambush of Naval Forces", enclosure to Director, R&D Field Unit-Vietnam, Memorandum for the Director, Remote Area Conflict (July 15, 1965) (UNCLASSIFIED) (PA 17,597).

(U) This report describes the ambush of a resupply operation on the Saigon River in July 1965.

(I-15) Dunning, Bruce B., "Summary Statistics on VC River Incidents FY 1965 (U)", from Advanced Research Projects Agency, R&D Field Unit-Vietnam, APO 143, San Francisco, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Joint Research and Test Activity, APO, San Francisco, California 96309 (August 20, 1965) (CONFIDENTIAL) (PA 18,223).

SECRET

(This page is Confidential/NOFORN)

(I-15) (Cont'd) (C) "...Director JRATA requested data on the incidence rate of river ambush incidents during the past twelve months. This information is for the purpose of evaluating the RAG requirement for employment of a Claymorette system...Of a total of 85 inland waterway incidents during FY 1965, 22 are classified as true ambushes of which 19 were simple ambushes and 3 were ambushes with mining. Casualties during these incidents were 40 killed, 147 wounded."

(I-16) Drachnick, J. B., "Concept for a U. S. River Warfare Force (U)", from Military Assistance Advisory Group-Vietnam, Navy Section, Saigon, Vietnam (August 17, 1962) (CONFIDENTIAL) (PA 18,800).

(U) This is a plan for a "new U. S. force to be organized, equipped, and trained for river warfare." The plan is a forerunner of the present river forces.

(I-17) Dunning, Bruce B., "Trip Report - Vietnam/Cambodia Border Area From Ap Phu Hoa to Ha Tien (U)", from Office of the Secretary of Defense, Advanced Research Projects Agency, R&D Field Unit-Vietnam, APO 143, San Francisco, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (September 30, 1965), 8 pp (CONFIDENTIAL/NOFORN) (PA 18,879).

(C/NF) The author "made a trip to visit Special Forces Units along the Canal de Vinh Te and on the Bassac River, 13-20 September 1965. His interest was in observing, first hand, the border anti-infiltration and river security problems. He concludes, in general, that the major problem in the Northwest Delta area is one of command and control; that the effectiveness of waterway security operations can be improved significantly by the achievement of adequate coordination and that VC infiltration operations can be severely inhibited by the employment of coordinated land/water/air operations."

(I-18) Brinton, G., Clare, K., and Dow, I., "Analysis of Naval Involvement in Counterinsurgency Operations (U)", Final Report, Stanford Research Institute, Southern California Laboratories, South Pasadena, California (April 1965), 78 pp (SECRET) (PA 20,215).

(U) "This study is concerned with an analysis of the nature of counterinsurgency warfare. Specific consideration is given to a characterization of insurgency, to the essential characteristics of counterinsurgency activities of a beleaguered government, and particularly to the role of the United States in counterinsurgency. The potential requirements for various types of naval operations on inland and coastal waters in counterinsurgency situations are examined. In addition to the requirements for advisory and technical assistance and support for counterinsurgent naval forces, the potential requirements for direct participation of U. S. Navy

SECRET

SECRET

- (I-18) (Cont'd) (U) forces in certain types of counterinsurgent situations are identified. U. S. Navy capabilities for supporting or engaging in particular types of counterinsurgent naval operations are reviewed, and opportunities or requirements for research that would lead to improved capabilities or readiness to support counterinsurgent operations are identified and described."
- (I-19) Bucklew, P. H., "Report of Recommendations Pertaining to Infiltration Into South Vietnam of Viet Cong Personnel, Supporting Materials, Weapons and Ammunition (U)", from U. S. Military Assistance Command-Vietnam, APO 143, San Francisco, California (February 15, 1964) (SECRET) (PA 20,412).

(S) This document is also known as the "Bucklew Report." The study was designed:

"To assist in initiating a program for countering infiltration into the Delta Area of South Vietnam of weapons, ammunitions and materials supporting the military operations of the Viet Cong, with specific concern directed to rivers, canals and sea approaches. To assist in the research of methods and routes utilized by the Viet Cong. To estimate the magnitude and effectiveness of various methods and tactics employed by the Viet Cong. To examine counter-measures being employed in the Republic of Vietnam by both military and civilian agencies. To generate ideas and make appropriate recommendations for instigating and improving counter-measures. To develop a program to control movements of Viet Cong contraband, including personnel, on rivers and canals within the Delta, its contiguous Coastal and Border waterways and Sea approaches."

- (I-20) "Project PEBBLE. A Study of Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume I: Assumptions, Conclusions and Recommendations (U)", from National Academy of Sciences, National Research Council, Mine Advisory Committee, Washington, D. C. (November 1965) (SECRET/NOFORN) (PA 21,378).

(U) The Project PEBBLE group conducted a very thorough study of land and water mines and their uses, as well as swimmer attacks. This volume is a summary. See also I-21 and I-73.

- (I-21) "Project PEBBLE. Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume III: Bibliography (U)", Final Report No. NRC:MAC:2019 (AD 371 950 L), from National Academy of Sciences, National Research Council, Mine Advisory Committee, Project PEBBLE Study Group, Washington, D. C. (March 1966) (CONFIDENTIAL) (PA 22,032).

(U) This bibliography cites approximately 900 items on all phases of land and water mine warfare, swimmer attacks and guerrilla operations in general. It is not annotated. See also I-20 and I-73.

SECRET

- (I-22) Chappelle, Dickey, "Water War in Vietnam", National Geographic, Vol 129 (2), pp 272-296 (February 1966) (UNCLASSIFIED) (PA 22,315).

(U) This is a good unclassified presentation of the difficulties and problems associated with riverine warfare in the RVN.

- (I-23) Brown, E. W., "Summary, V. C. Incidents Against Boats, 1963 (U)", Report No. CINCPAC 5604, from Commander in Chief Pacific, FPO, San Francisco, California, for Battelle Memorial Institute, RACIC, Columbus, Ohio (May 18, 1966), 6 pp (SECRET) (PA 22,316).

(C) The summary shows all VC incidents involving boats classified by province and date during 1963. Figures and tables have extracted information showing casualties, mine incidents, and ambushes.

- (I-24) "Doctrine for Riverine Operations", Report No. FMFM 8-4 (AD 481 135), from Department of the Navy, Headquarters, U. S. Marine Corps, Washington, D. C. (February 13, 1967), 222 pp (UNCLASSIFIED) (PA 23,719).

(U) The basic U. S. Marine doctrine for riverine operations as related to the landing force is promulgated in this Fleet Marine Force Manual.

- (I-25) Brumbaugh, D. A., Kirkland, J. T., and Muller, J. A., "Analysis of Threat in Inshore Undersea Warfare (U)", Report No. 259 (AD 359 248 L), from Operations Research, Inc., Silver Spring, Maryland, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. NObsr-89164 (January 20, 1964), 84 pp (SECRET) (PA 23,791).

(S) "This report analyzes the characteristics of the threat that must be countered by IUW forces. The environments in which the threat elements are likely to be found are discussed. The effects of these environments, both restrictive and enhancing, are identified and discussed in order to provide a more complete definition of the factors to be considered in the missions of IUW forces..."

(S) "The threat analysis considers enemy weapons appropriate for inshore utilization as well as complementary methods of delivery of these weapons. Potential enemy weapons are demolition charges, torpedoes, and mines. Delivery techniques considered include seagoing, coastal, and midget submarines as well as swimmers and swimmer-support vehicles."

(S) "Operating environments considered in this analysis are shallow-water areas in the vicinity of amphibious assault, over-the-beach transport, or conventional harbor operations. The effects of these environments on the enemy's utilization of weapons and delivery techniques are explored."

SECRET

(This page is Confidential)

- (I-26) Croizat, Victor J., "Naval Forces in River War", U. S. Naval Institute Proceedings, pp 53-61 (October 1966) (UNCLASSIFIED) (PA 24,448).

(U) This is a very lucid discussion of the role, composition, armament, and tactics of riverine forces.

- (I-17) Harrigan, A., "River and Shallow-Water Warfare", Military Review, Vol XLV (10), pp 77-83 (October 1965) (UNCLASSIFIED) (PA 24,502).

(U) This is an excellent discussion of the necessity for the U. S. Navy to move into the riverine warfare field in great strength.

- (I-28) Bontadelli, J. A., Nielsen, K. L., and Virgin, W. P., "Swamp Forest Warfare (U)", Report No. BAT-171-45 (AD 376 328 L), from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-171 (May 16, 1966), 150 pp (SECRET) (PA 24,510).

(U) "Applicable weapon systems, general operational concepts, and associated problems and requirements of combat operation in the swamp forest areas of South Viet Nam are studied. There are discussions on the physical characteristics of the swamp forest areas with emphasis on the Mekong Delta and the Ca Mau Peninsula; threats and potentials of swamp forest warfare; United States inventory of weapons systems applicable to swamp forest warfare; and the state of the technical art in the areas of swamp forest weaponry. Also discussed are the preferred weaponry inventories for swamp warfare, preferred operational concepts for this weaponry, and the research and development required to improve current capabilities. The effect of denying potable water on enemy efficiency in saline swamp forest areas is also considered." (See also I-29.)

- (I-29) Bontadelli, J. A., Nielsen, K. L., and Virgin, W. P., "Swamp Forest Warfare: Summary (U)", Report No. BAT-171-45-1 (AD 376 327 L), from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-171 (May 16, 1966), 22 pp (SECRET) (PA 24,511).

(U) This is a summary of item I-28.

- (I-30) "Investigate the Usefulness of Air Cushion Ships in Naval Missions (U)", Final Report (AD 368 946 L), from Commander, Operational Test and Evaluation Force, Norfolk, Virginia, for Department of the Navy, Bureau of Ships, Washington, D. C. (January 3, 1966), 82 pp (CONFIDENTIAL) (PA 24,897).

(C) "The potential military usefulness of Air Cushion Vehicles (ACV) was investigated utilizing three differently configured craft, the SRN-5, the VA-3 and the SKMR-1. The investigation did not examine the individual characteristics of each craft, but rather their overall application to the field of naval warfare...During the tests, ACV were operated

I-8

SECRET

SECRET/NOFORN

(This page is Confidential)

- (I-30) (Cont'd) (C) in seas to a maximum of 18 feet, under low visibility (1/8 mile) conditions and over all types of terrain normally encountered in coastal areas. Surf heights ranged from 2 feet to a maximum of 9 feet during the test program."
- (I-31) "Lessons Learned No. 47: River Assault Group Operations (U)", from Headquarters, U. S. Military Assistance Command, Vietnam, APO, San Francisco, California 96243 (March 30, 1965), 14 pp (CONFIDENTIAL/MODIFIED HANDLING AUTHORIZED) (PA 24,919).
- (U) The River Assault Groups (RAG), "...since their formation by the French in 1946, have played an important role in combat operations on Vietnam's extensive network of inland waterways. The RAGs provide, as direct support for corps commanders, Naval Forces to perform combat lift, logistic and gunfire support, patrol escort and minesweeping. Each of the VNN's six RAG units can embark and support a battalion of troops for independent operations in enemy-controlled areas for a period of 10-14 days. This issue of "Lessons Learned" discusses two operations involving RAG support of ground operations and illustrates the value of naval support to military operations in the Delta area..."
- (I-32) "Lessons Learned No. 50: Naval Conduct of Amphibious Operations (U)", from Commander, U. S. Military Assistance Command, Vietnam (J3), APO, San Francisco, California 96243 (April 13, 1965), 7 pp (CONFIDENTIAL/MODIFIED HANDLING AUTHORIZED) (PA 24,992).
- (C/MHA) "Amphibious operations conducted in Vietnam bear little resemblance to the massive landings carried out by US Naval Forces in World War II, or, on occasion, in Korea. Although the opportunity to conduct waterborne operations is ever present, the orientation of RVNAF leaders toward ground warfare and lack of appreciation for Naval capabilities has precluded extensive use of the VNN's amphibious capability. Thus, training for amphibious operations has not been emphasized. Amphibious landings, for the most part, have been of the administrative variety, transporting troops from Point A to an unopposed landing at Point B. Offensive waterborne operations utilizing landing ships such as LSTs, LSMs, LSILs, LSSLs and the smaller LCMs and LCVPs have been conducted. Fortunately these landings were largely unopposed. Had opposition been encountered, the errors committed during the landing and debarkation phases of the operations might have produced disastrous results for friendly forces. This lesson describes two such offensive type amphibious landings. It will be noted that many basic principles which should have been considered were ignored. The lessons set forth provide solutions to basic problems which must be overcome if amphibious operations are to be properly conducted..."
- (I-33) "A Handbook of U. S. Naval Systems and Operations (U)", Report No. ONR-ACR-NAR-30, from Department of the Navy, Office of Naval Research, Naval Analysis Group, Washington, D. C. (June 1965) (SECRET/NOFORN) (PA 25,120).

SECRET/NOFORN

SECRET/NOFORN

(I-33) (Cont'd) (U) "The study is a condensation of information on current naval systems, of background information on how these systems are employed, and of information on some systems that are not yet operational. It includes specific characteristics of the more significant operational naval weapon systems and of some systems in advanced development, operation development, engineering development, exploratory development, and advanced design. The study does not assess nor indicate preferred systems; neither does it indicate profitable directions for future research and development..."

(I-34) Lence, R. H., et al., "Navy Contributions to Deterrence at Conflict Levels Less Than General War 1975-80, Summary Volume (U)", Final Report No. 14, from The Franklin Institute, Center for Naval Analyses, Arlington, Virginia, for Department of the Navy, Office of Naval Operations, Washington, D. C., Contract No. Nonr-3732(00) (January 1966) (SECRET/NOFORN) (PA 25,301).

(S/NF) "The primary objective of the study was to examine the interactions between naval force and political objectives in possible future conflicts below general war so that Navy contributions to preventing or, if necessary, fighting could be identified.

(S/NF) "The Institute of Naval Studies was given wide latitude so that the concepts evolved would not be constrained to the "hardware" type study based on present programs and capabilities. The study bases projections of limited conflicts for the 1966-1980 period on a thorough historical-political analysis of conflicts that took place between 1946 and 1964...the study contains an excellent projection of the geopolitical environment for the period. However, because of the method of analysis, it must be borne in mind when using the results that interpretation is most valid in terms of broad patterns and trends."

(U) There are three annexes and five appendices to this report as well as this summary volume.

(I-35) Dunning, Bruce B., "The U. S. Navy's Role in Counterinsurgency: An Evaluation (U)", a Thesis presented at the U. S. Naval War College, Naval Warfare Course, Newport, Rhode Island (June 18, 1965), 78 pp (SECRET) (PA 25,662).

(S) "The U. S. Navy has, in general, failed to raise counter-insurgency to the level of a major strategic concept and has tended to consider counterinsurgency as a collateral function inferior to conventional naval strategies. Concomitant with this failure has been a failure to recognize the full role of the U. S. Navy in counterinsurgency and to provide the guidance, organization and training that will permit the Navy to carry out that role."

UNCLASSIFIED

- (I-36) "Mekong Delta Mobile Afloat Force (MDMAF) Concept (U)", from Commander, United States Military Assistance Command, Vietnam, APO, San Francisco, California (March 13, 1966) (SECRET) (PA 27,031).

(U) This was another design which was a precursor of the present delta afloat forces. Many of the recommendations were used.

- (I-37) MacLeod, K. L., "River Warfare (U)" (AD 827 789 L), from Department of the Navy, U. S. Naval Amphibious School, Coronado, California (July 1966), 48 pp (CONFIDENTIAL) (PA 27,445).

(U) "Although the Navy was specifically tasked with developing a capability for riverine operations during the Civil War, and later participated in River Operations in China and elsewhere, there exists neither an overall doctrine to guide both land and waterborne forces nor a specific doctrine for Navy involvement in riverine operations. This paper proposes an approach to that doctrine and will explain the necessity for establishing the scope of the mission and the concept of operations prior to selecting or designing the craft and equipment."

- (I-38) "Shallow-Water Naval Warfare-Analysis of Threats and Capabilities (U)", Report No. NRC-MAC-2025 (AD 378 140 L), from National Academy of Sciences, National Research Council, Mine Advisory Committee, Washington, D. C., for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-2300(10) (November 1966), 102 pp (SECRET/NOFORN) (PA 27,453).

(U) "The probability of different levels of warfare occurring during the foreseeable future, and the major threats to be encountered by the Navy in the shallow-water environment at each of these levels, are analyzed. The Navy's present capability to counter each of the identified threats is discussed in some detail, and recommended actions to strengthen areas of weakness are set forth."

- (I-39) "Counterinsurgency Lessons Learned No. 61: Salient Lessons Learned (U)" (AD 378 922), from Headquarters, U. S. Military Assistance Command, Vietnam, APO, San Francisco, California, for Headquarters, Department of the Army, Washington, D. C. (January 27, 1967), 31 pp (CONFIDENTIAL/MODIFIED HANDLING AUTHORIZED) (PA 27,591).

(U) This document, one of a series, contains a mixed bag of lessons learned. Pages 22 to 24 describe a number of lessons concerning river patrols.

- (I-40) Nelson, Andrew G., and Mosher, Norman G., "Proposed: A Counterinsurgency Task Force", U. S. Naval Institute Proceedings, pp 36-45 (June 1966) (UNCLASSIFIED) (PA 27,695).

UNCLASSIFIED

(I-40) (Cont'd) (U) This is a discussion of the types of ships and boats in the Navy's current (1966) inventory (as well as projected) which are useful in riverine and coastal warfare. It describes the authors' ideas as to what a riverine and coastal task force might consist of, and outlines what types of duties would be performed by the various ships and craft.

(I-41) Harrigan, Anthony, "Inshore and River Warfare", Orbis, Vol 10 (3), pp 940-946 (Fall 1966) (UNCLASSIFIED) (PA 27,701).

(U) This article discusses the needs of the U. S. for a doctrine and force for riverine warfare. It outlines areas of the world where we may need such a force and describes the author's ideas of the types of boats needed.

(I-42) Harllee, J., "Patrol Guerrilla Motor Boats", U. S. Naval Institute Proceedings, Vol 90 (4), pp 70-90 (April 1964) (UNCLASSIFIED) (PA 27,864).

(U) "Naval planners have long thought in terms of the air above the seas, the surface of the open seas, and the waters below the surface. There are still other regions of the sea at which the U. S. Navy needs to take a better look--the coastal, interisland, and river delta waters in and around foreign lands...

(U) "Small warships are needed for the control of coastal and interisland waters and river mouths...In many parts of Asia, for example, our potential enemies are short of land transportation and would therefore use coastal and river waterways as much as possible to mount and support a war effort.

(U) "...Proposals have been made that our allies handle small craft operation while this country's Navy assumes responsibility for the high seas. But most of our allies outside Europe do not have such a capability. I am convinced that the United States should control certain situations directly with its own small warships."

(I-43) "The River War", Newsweek, p 33 (July 13, 1967) (UNCLASSIFIED) (PA 28,131).

(U) This is a good description of an engagement in which a part of River Assault Flotilla One participated in the Delta area.

(I-44) Endacott, Jack A., "Waterbased Counterinsurgency", a Thesis presented at the Naval War College, Newport, Rhode Island (March 2, 1964), 42 pp (UNCLASSIFIED) (PA 28,659).

(U) This study examines "the importance of the coastal and inland waterways in the various areas of the world where the possibility of insurgent warfare exists. Assuming the United States has been invited and has committed certain

CONFIDENTIAL

(This page is Unclassified)

- (I-44) (Cont'd) (U) forces, the advantages of using these waters in a counter-insurgency effort is examined. A study is then made of the present use of coastal and inland waters in counterinsurgency operations. Finally, new concepts in waterbased counterinsurgency are proposed using weapons and craft in the present inventory of the United States Navy as well as the new oncoming generation of hydrofoils, ground effect machines, helicopters and V/STOL aircraft".
- (I-45) Baker, John W., and Dickson, Lee C., "Army Forces in Riverine Operations", Military Review, Vol 47 (8), pp 64-74 (August 1967) (UNCLASSIFIED) (PA 28,975).
- (U) "The movement of combat battalions and support units of the U. S. 9th Infantry Division into the Mekong Delta has brought to the U. S. Army a new challenge even for Vietnam. It marks the opening of a new phase in the war--a concentrated effort to defeat the Viet Cong in the Mekong Delta by riverine warfare."
- (I-46) Meyer, Richard M., "The Ground-Sea Team in River Warfare", Military Review, pp 54-61 (September 1966) (UNCLASSIFIED) (PA 28,978).
- (U) The author calls for establishment of a joint Army-Navy-Marine doctrine for river warfare and makes some recommendations for such a doctrinal publication.
- (I-47) "Feasibility of Developing and Employing Polyurethane Foam as a Line of Communication Interdiction System", from Battelle Memorial Institute, RACIC, Columbus, Ohio (August 1967), 23 pp (UNCLASSIFIED) (PA 29,343).
- (U) This is a study of the possibility of using polyurethane foam to block and obstruct guerrilla trails, streams, water arteries, harbors, and seaports.
- (I-48) Burgener, R. C., "A Survey of Methods for Detection of Swimmers, Sound, and Small Boats (U)", Report No. R-633, from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Airtronics, Inc., Washington, D. C. (August 25, 1966), 16 pp (SECRET/NOFORN) (PA 29,415).
- (U) This is "a brief state-of-the-art report on listening devices that can be used to detect the sound of small boats and underwater swimmers moving through the water and the sound of voices carried through the air...The devices covered by this report are limited to those that are relatively small and lightweight..."
- (I-49) Fry, J. N., and Van Zwalenburg, Paul R., "River Patrol Requirements Model (U)", Report No. 6-67, from Headquarters, Commander in Chief Pacific, Scientific Advisory Group, FPO, San Francisco, California (April 1, 1967), 11 pp (CONFIDENTIAL) (PA 30,051).

CONFIDENTIAL

CONFIDENTIAL

(I-49) (Cont'd) (C) "This paper develops a technique for determining the probable effectiveness of a river patrol craft in intercepting enemy craft attempting to cross a relatively narrow river. From these estimates of effectiveness, it is possible to determine the approximate number of patrol units required for any length of river to yield a desired probability of interception."

(I-50) "U. S. Navy Research and Development Unit First Semi-Annual Progress Report (U)", from Department of the Navy, Navy Research and Development Unit, Vietnam, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (July 1, 1967), 39 pp (SECRET) (PA 30,381).

(C) "The report describes a number of projects on which final reports were made, including evaluation of a mine locator, anti-swimmer net, small boat sonar, and a survey of riverine mine countermeasures in Vietnam..."

(I-51) Searle, W. F., Jr., "The Case for Inshore Warfare", The Naval Review 1966, pp 3-23 (1966) (UNCLASSIFIED) (PA 30,917).

(U) "In this essay we will take a new look at what has been called river warfare, or naval warfare in confined waters and narrow seas, and which collectively, can be called inshore warfare (ISW). I intend to demonstrate that ISW is a form of naval warfare unto itself which, especially in this era of Cold War and counterinsurgency confrontations, warrants as much consideration as do antisubmarine, amphibious, and naval strike warfare. I also intend to spell out the many uses for this type of warfare, and to suggest how ISW might be organized in support of warfare other than general conventional war."

(I-52) Dow, Irving, and Clare, Kenneth, "A Preliminary Analysis of Sublimated War and an Identification of Naval Missions and Capabilities Required in Sublimated-War Situations", Final Draft Report, from Westwood Research, Inc., Los Angeles, California, for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-4962(00) (September 1966), 143 pp (UNCLASSIFIED) (PA 30,942).

(U) "The objectives of this preliminary study are (1) to develop an appreciation of the nature and characteristics of low-level conflict situations or sublimated war (as distinguished from limited war) and (2) to relate any particular characteristics of sublimated war and requirements for support or conduct of this type of conflict to Navy and Marine Corps capabilities and readiness, drawing tentative conclusions regarding possible requirements or opportunities for development of improved capabilities to meet the threats of low-level conflict situations." One portion of the study discusses river patrol operations.

CONFIDENTIAL

SECRET

- (I-53) Dow, Irving, and Brinton, George, "Mekong Delta River Patrol: An Analysis of River Patrol Operations in Counter-Insurgency Warfare (U)", Draft Report, from Westwood Research, Inc., Los Angeles, California, for Office of Naval Research, Washington, D. C., Contract No. Nonr-4962(00) (December 1966), 106 pp (SECRET) (PA 30,943).

(S) "The overall objective of this study has been to provide an analytical basis for selecting craft and establishing the essential structure of a river patrol force for counterinsurgency warfare, treating the Mekong Delta of South Vietnam as the problem area. The analytical approach through which this objective has been achieved is briefly as follows. First, the potential requirement for a river patrol was assessed relative to a number of critical environmental conditions... and relative to the politico-military situation...The next step was to formulate the specific types of river patrol missions that would be of significant assistance in combatting the insurgent threat...The operational means by which these missions might be accomplished were then analyzed and described in terms of the general concept of employment and the particular functions or operational tasks that would be performed by the river patrol force. Within this framework it was then possible to specify the types of craft and other resources and the characteristics of the organization that would be required for river patrol operations. Finally, basic relationships are established between the numbers and speed of craft that might be required and the level of detection and intercept capability that could be achieved in given types of situations."

- (I-54) Bartman, Thomas F., "A Boat Marking System for Use in the South Vietnamese Delta (U)", Report Nos. HI-809-RR, and HI-67-203, from Hudson Institute, Croton-on-Hudson, New York, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. DAHC-67-C-0003 (June 16, 1967), 53 pp (SECRET) (PA 31,509).

(U) The author indicates that a great need exists for a system of marking boats for later identification and calls for a crash program for its development.

- (I-55) Mairs, Robert, and Bright, Chester, "Potential Uses of a Swimmer Operated Craft in Oceanography and Riverine Warfare (U)", Report No. IR-67-58 (AD 383 730 L), from U. S. Naval Oceanographic Office, Research and Development Department, Coastal Oceanography Branch, Washington, D. C. (August 1967), 13 pp (SECRET) (PA 31,552).

(U) "Many areas of oceanographic/hydrographic interest consist of small, shallow rivers, canals, lagoons, land-locked lakes, shoal areas, and swampland that are either inaccessible or highly difficult to reach with any conventional size craft equipped with modern instrumentation. This difficulty is compounded in combat areas such as Vietnam.

SECRET

SECRET

(This page is Unclassified)

- (I-55) (Cont'd) (U) "There exists a definite need for a craft to be used in these areas that is extremely mobile, rapidly transportable, easy to operate, fast, small, lightweight, and on which various oceanographic and hydrographic instruments can be placed..."
- (I-56) "Border Security/Anti-Infiltration Operations", Final Report, Vol 9, Annex J, from U. S. Army Combat Developments Command, Institute of Special Studies, Carlisle Barracks, Pennsylvania (December 1967), 141 pp (UNCLASSIFIED) (PA 31,706).

(U) This volume of the study is a proposed training text. A section of the text is devoted to discussion of the problem of control of riverine borders.

- (I-57) Dawdy, Benny Lynn, "A Probability Model and Patrol Planning Device for Counter-Insurgency Operations on the Mekong River" (AD 822 795), a Thesis presented at the U. S. Naval Postgraduate School, Monterey, California (June 1967), 41 pp (UNCLASSIFIED) (PA 31,751).

(U) "River warfare in Vietnam and Thailand has brought about an increased interest in river patrol techniques. To aid the river patrol in their operations a probability model is constructed that could be used for the search of large groups of boats in a sector of a river. With this model, the patrol personnel can search a portion of the boats and make predictions of the actual number of insurgent craft present, or, with intelligence information they can predict the number of insurgent craft they will expect to find in a group of boats. Also, a graphical aid is developed that should be of use to the patrol personnel in planning their patrols. By use of the graphical aid they can efficiently distribute their searching efforts in the most probable areas of insurgent activity."

- (I-58) Spore, John B., "Floating Assault Force: Scourge of the Mekong Delta", Army, Vol 18 (2), pp 28-32 (February 1968) (UNCLASSIFIED) (PA 32,123).

(U) This is an excellent description of the joint Army-Navy Mobile Riverine Forces telling how and where they operate.

- (I-59) Bittner, Barry N., Climo, William H. Jr., and Wolff, Kenneth L., "Fire Support of Riverine Operations by M109 and LVTH6-A1 Embarked in LCM-8; Report of Test", Final Report (AD 821 321), Marine Corps Schools, United States Marine Corps, Marine Corps Landing Force Development Center, Quantico, Virginia 22134, October 5, 1967, 7 pp + Appendices A Through D (UNCLASSIFIED) (PA 32,235).

(U) "A test was conducted in order to determine the feasibility of employing the LVTH6-A1 and M109 embarked in an LCM-8 as a means of fire support to infantry engaged in riverine operations."

SECRET

CONFIDENTIAL/NOFORN

- (I-60) "Viet Cong Use of Oriental and Occidental Rivers (U)", Report No. 66-11, from Headquarters, Armed Forces of Republic of Vietnam, Office of Joint General Staff, J2, and Headquarters, U. S. Military Assistance Command-Vietnam, Office of Assistant Chief of Staff, Combined Intelligence Center, Vietnam, APO, San Francisco, California, for Advanced Research Projects Agency, R&D Field Unit-Vietnam, APO, San Francisco, California (Rec'd. April 9, 1968), 15 pp (CONFIDENTIAL/NOFORN except Republic of Vietnam, Australia, New Zealand, and The Republic of Korea) (PA 32,240).

(C/NF) "This study deals primarily with the Viet Cong use of the Oriental River. However, in order to provide a more complete picture of the river's influence on VC supply and movement, the study area also includes the Occidental River and the complete drainage system of the Oriental River...The study attempts to determine the extent of VC utilization of the Oriental River for the movement of supplies and troops. Specifically, it attempts to locate the exact routes of supply, the destination of goods, the quantities shipped, and the frequency of movement. It includes a graphic presentation of the area to provide the reader with a basis for evaluation of the potential use of the area by the Viet Cong and attempts to tie together all aspects of terrain, lines of communication, enemy order of battle, enemy installations, and enemy routes of movement."

- (I-61) "VC Tactical Use of Inland Waterways in South Vietnam (U)", Report No. 66-44, from U. S. Military Assistance Command, Vietnam, Office of the Assistant Chief of Staff, Intelligence, APO, San Francisco, California 96243, Headquarters, Armed Forces of the Republic of Vietnam, Office of Joint General Staff, and Combined Intelligence Center, Vietnam (April 28, 1966), 13 pp (CONFIDENTIAL/NOFORN except Republic of Vietnam, Australia, New Zealand, and The Republic of Korea) (PA 32,292).

(C/NF) "This study attempts to assemble all known data on Viet Cong tactical use of the waterways of South Vietnam and explains the 'how' and the 'why' of Viet Cong water transport doctrine, movement, and capabilities. The study deals with waterborne infiltration from Cambodia and major routes that the VC use to move supplies and equipment throughout the Delta. The number of craft employed for troop transport and supply movement is discussed as well as Viet Cong transshipment capabilities."

(C/NF) "The study emphasized that control of the waterways is the key to the successful prosecution of the counter-insurgency effort in the Mekong Delta. It suggests that a tremendous amount of supplies and a great number of troops are moved over the inland waterways of the Delta in support of Viet Cong objectives. Finally, it explains that the waterways are the focal point of all Viet Cong activity in the Delta and are, in effect, the Viet Cong's lifestream."

CONFIDENTIAL /NOFORN

(This page is Unclassified)

- (I-62) "Riverine Operations", Report No. TT-31-75, from Department of the Army, U. S. Army, Combat Developments Command, Fort Belvoir, Virginia (January 17, 1967), 345 pp (UNCLASSIFIED) (PA 32,293).

(U) "This draft training text outlines interim tactics, techniques, and procedures for tailoring, training, and employing a ROAD infantry division for cold or limited war where inland waterways are the primary lines of communication. It covers concepts and operating techniques and procedures for tailored infantry division and their units, applying particularly to units based afloat and/or supported by waterborne means. It covers environmental influences on land-based tactical operations in riverine warfare. It offers guidance in integrating the joint operations of ground forces, naval units, and supporting Air Forces. The nature of riverine operations makes the highest degree of coordination and cooperation between these forces mandatory. This text deals primarily with the riverine operations in areas like the Mekong River Delta in South Vietnam. Later editions will include guidance for riverine warfare in different environments and other parts of the world. The initial draft has not been approved by the Department of the Army or coordinated with the Department of the Navy."

(U) It is understood (November 1968) that a revised edition has recently been issued.

- (I-63) Corriher, H. A., Jr., et al., "Radar Reflectivity of Sea Targets", Final Report, Volume I, from Georgia Institute of Technology, Engineering Experiment Station, Atlanta, Georgia, for Department of the Navy, Office of Naval Research, Air Programs Branch, Washington, D. C., Contract No. Nonr-991(12) (September 30, 1967), 114 pp (UNCLASSIFIED) (PA 32,316).

(U) "Volume I of this two-volume survey presents a broad overview of the state of knowledge of radar reflectivity of sea targets. All forms of targets are considered, including ships and boats, submarines, periscopes and snorkels, wakes, buoys, icebergs, and splashes."

- (I-64) "History of Naval Operations Vietnam: 1946 - 1963 (U)", from U. S. Navy, Office Chief of Naval Operations, Naval History Division, Washington, D. C. (June 1964), 247 pp (SECRET) (PA 19,770).

(U) This is a very complete and thorough study of the subject which includes all phases of naval operations by the French Navy, U. S. Navy, and South Vietnamese Navy.

CONFIDENTIAL

- (I-65) Muller, J. A., Cornell, M. E., and Brumbaugh, D. A., "Analysis of Attack Weapon Systems for Inshore Undersea Warfare (U)", Report No. 258 (AD 359 103 L), from Operations Research Inc., Silver Spring, Maryland, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. NObsr-89164 (January 20, 1964), 54 pp (CONFIDENTIAL) (PA 25,643).

(C) "This report describes weapons and weapon delivery systems that are potentially useful attack systems against the various enemy threats encountered in IUW situation. The material contained herein provides the necessary information for integrating an attack capability into a complete system that also detects and localizes impending threats to naval IUW operations...Potential targets for attack systems consist of swimmers; small surface craft; and fleet, coastal, and midget submarines. This analysis determines the effectiveness radii of appropriate surface and underwater weapons including depth bombs, torpedoes, scatter weapons, small arms, and high-explosive warheads; and includes weapon parameters, e.g., size, weight, and potential accuracy. Weapon delivery systems, compatible with the various weapons, are also described. The delivery systems are constrained by the requirement of mobility inherent in practical IUW systems and include manned and drone helicopters, motor boats, hydrocraft and rockets."

- (I-66) Beebe, Robert P., "Operations in Restricted Waters", U. S. Naval Institute Proceedings, pp 23-33 (June 1962) (UNCLASSIFIED) (PA 27,968).

(U) "Naval operations in restricted waters -- those water areas in which the use of small craft is possible -- and for some purposes essential -- has a history as old as man's use of the sea itself...The ...naval tactician of today, immersed in carrier striking forces, logistic replenishment groups, guided missiles, and antisubmarine warfare, is apt to forget that striking blows at the enemy in the manner described is still part of his job if it can be done with profit to the overall operation... To a student of naval warfare casting about for methods and tactics not only to meet, but to break the Communist menace, it is quite apparent that the U. S. Navy is so preoccupied with "blue water" operations stemming in concept from our greatest successes in the last war that the possibilities of other approaches are being neglected. ...History clearly shows such a narrow view is unsound."

- (I-67) "5th Annual Military Systems Directory", Armed Forces Management (April 1967) (UNCLASSIFIED) (PA 28,500).

(U) This directory lists over 3000 major weapon and support systems and programs. It includes ships and boats as well as all types of weapons.

CONFIDENTIAL

CONFIDENTIAL

- (I-68) Logan, Robert S., Webber, Wendell E., and Wilens, Martin E., "Vietnam Evaluation Personnel Air Cushion Vehicle (PACV) (U)", Final Report (AD 379 188), from U. S. Navy Research and Development Unit, APO, Vietnam, for Department of the Navy, Chief of Naval Operations (OP-345), Washington, D. C. (January 29, 1966), 167 pp (CONFIDENTIAL) (PA 28,673).

(C) Three PACVs were evaluated in Vietnam to assess the capabilities of the vehicle to perform naval missions in support of MARKET TIME and GAME WARDEN operations and to determine the potential military usefulness of air-cushion vehicles in the SEA environment. During the 7-1/2 months deployment, approximately 3 months were required to accomplish extensive field modifications and performance tests.

- (I-69) Salter, Richard, et al., "Vietnam Research Studies, Volume I: Plain of Reeds Warfare (U)", Final Report No. PRC-906 (AD 382 631), from Planning Research Corporation, Los Angeles, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (September 15, 1966), 125 pp (CONFIDENTIAL) (PA 28,708).

(U) This report analyzes the requirements for personnel, weapons and land and water vehicles required for counterinsurgency operations in the Plain of Reeds.

- (I-70) Wilson, Dennis J., "Single Country Study: The River Warfare Potential of Venezuela", from Department of the Navy, U. S. Naval Ordnance Test Station, China Lake, California (May 6, 1964) (UNCLASSIFIED) (PA 31,059).

(U) "An analysis of the potential of river warfare in Venezuela is presented herein and is based on the assumption that land and/or waterways that are economically important are also militarily important. Venezuela was selected for study because (1) it is representative of the countries with a history of internal conflict that are currently at peace and, (2) it is a country with an extensive internal waterway system."

- (I-71) "Riverine Warfare (U)", Interim Report (AD 382 219 L), from Marine Corps Schools, Marine Corps Landing Force Development Activities, Quantico, Virginia (June 29, 1967), 10 pp (CONFIDENTIAL) (PA 31,557).

(C) "The purpose of this study is to determine Marine Corps requirements for tactics, techniques, material and organizations for the conduct of riverine operations in the current to mid-range time frame...A study group has been established at the Marine Corps Landing Force Development Center. This study group met for the first time on 20 April 1967 to discuss first, the approach to be taken in the execution of the requirements stipulated and second, to begin the immediate review of U. S. Army TT 31-75, Interim Training Text...The results of this review have been completed and comments have been submitted...The study group has addressed the subjects

CONFIDENTIAL

CONFIDENTIAL

(I-71) (Cont'd) (C) of fire support, air support, communication-electronics, combat service support, boating, image-intensification devices and training requirements as they relate to riverine warfare. Subsequent paragraphs discuss problem areas, actions taken and actions initiated relating to each of these subjects."

(I-72) "Operational Report. Lessons Learned (U)" (AD 386 516), from Department of the Army, 11th Combat Aviation Battalion, APO, San Francisco, California 96289, for Department of the Army, Office of the Adjutant General, Washington, D. C. (October 30, 1967), 147 pp (CONFIDENTIAL) (PA 32,164).

(U) Among other "lessons learned", this report discusses the advantages of landing troops from helicopters at low tide in areas affected by tidal flux.

(I-73) "A Study of Mine and Mine Countermeasures Operations in Guerrilla Warfare: Project PEBBLE (U)", Final Report No. NRC:MAC:2019, Volume II, from National Academy of Sciences, National Research Council Mine Advisory Committee, Washington, D. C., for Office of Naval Research, Washington, D. C., and Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. 2300(10) (March 1968), 501 pp (SECRET/NOFORN) (PA 32,728).

(U) This document contains all the backup material for Volume I which is item I-20. See also I-21.

(I-74) Dow, Irving, Brinton, George, and Krisel, Lionel, "Analysis of Potential Requirements for Counterinsurgent River Warfare Operations in Laos (U)", prepared for Office of Naval Research and Naval Research Laboratory, Washington, D. C. by Westwood Research, Inc. (June 1967) (CONFIDENTIAL) (PA 34,022).

(C) "The objective of this study was to determine potential requirements for counterinsurgent river warfare operations on the Mekong in Laos. Environmental conditions and the characteristics of the waterways were analyzed. The politico-military situation and the nature of present and prospective insurgent threats in Laos and Northeast Thailand were studied. On the basis of the geographic appraisal and the investigation of present and future threat situations, requirements or opportunities for employment of river warfare forces were identified. For each type of river warfare operation an analysis was made of the missions, concepts of employment, and characteristics of craft that might be required."

(I-75) "Naval Review - 1968", edited by Frank Uhlig, Jr., U. S. Naval Institute, Annapolis, Maryland (1968) (UNCLASSIFIED) (PA 33,727).

(U) This book has three articles pertinent to the riverine/inshore warfare area. They describe Market Time Operations, an amphibious operation (JACKSTAY) carried out in the Rung Sat-Special Zone, and an article describing and picturing U. S. "fighting boats".

CONFIDENTIAL

(This page is Unclassified)

- (I-76) Cracknell, LCDR William H., Jr., "The Role of the U. S. Navy in Inshore Waters", Naval War College Review, Vol 21 (3), pp 65-91 (November 1968) (UNCLASSIFIED).

(U) The author states that the "purpose of this paper is to analyze the problem of inshore (including riverine) operations, recognizing the established pattern of unreadiness and improvisation, in order to determine if there exists a continuing need for such capabilities... after the Vietnamese conflict is settled".

(U) "The first chapter will analyze the possible threats which might require the Navy to maintain a continuing capability in inshore operations. The second chapter will present historical examples of the use of inshore operations and some of the lessons learned with possible application today. The third chapter will review the present commitment of the U. S. Navy in inshore operations in Vietnam. The fourth chapter will discuss possibilities for future application. Lastly, there will be an appreciation of the problem in the U. S. Navy today, along with several proposed courses of action the Navy might initiate." An excellent but unannotated bibliography is included.

- (I-77) "Naval and Maritime Requirements for Area Security: A Study of the Naval Requirements for Coping With the Threat of Sublimated War in the Maritime Regions of the Underdeveloped World (U)" (AD 430 180), from Atlantic Research Corporation, Georgetown Research Project, Alexandria, Virginia, for Naval Research Laboratory, Naval Analysis Activity, Washington, D. C., Contract No. N00014-66-C0261 (August 1967), 333 pp (SECRET/NOFORN) (PA 32,940).

(U) "An objective analysis has been made of the internal and external security needs of the nations within the major maritime regions of the world, in order to determine the naval capabilities required, during the next two decades, both within the nations in these regions and on the part of the United States, to satisfy these needs. This study is part of a larger U. S. Navy research program in "Sublimated Warfare". This term has been defined as a state of continuous international conflict and tensions, arising from basic ideological differences of major antagonists and representing a subtle threat to national security, wherein the necessary resources available are employed with varying intensity, short of limited war, to achieve national objectives. As a research device for determining the security needs described above, an Index of Susceptibility (to maritime sublimated war) has been constructed, composed of two sets of indicators. One set has a geographic base and the other a political-socio-economic base. By computing the Index of Susceptibility for each nation and each group of nations within a region, it is possible to establish a comparative

CONFIDENTIAL

UNCLASSIFIED

(I-77) (Cont'd) (U) order of regional susceptibility to the threat of sublimated war, and to use these findings as the principal determinant for establishing regional security needs. A comparison of such needs with existing and projected indigenous capabilities produces a pattern of security gaps. The estimate of the demands which may be placed upon the U. S. Navy and Marine Corps for remote area security are measured against these indigenous security shortfalls. Several optional ways of coping with regional security gaps are examined for feasibility and desirability."

I-23 and I-24

UNCLASSIFIED

FOR OFFICIAL USE ONLY

SECTION II

SOME HISTORICAL ASPECTS OF RIVERINE/INSHORE WARFARE (U)

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

(This page is Unclassified)

SECTION II

SOME HISTORICAL ASPECTS OF RIVERINE/INSHORE WARFARE

- (II-1) "Project PEBBLE. Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume III: Bibliography (U)", Final Report No. NRC:MAC:2019 (AD 371 950 L), from National Academy of Sciences, National Research Council, Mine Advisory Committee, Project PEBBLE Study Group, Washington, D. C. (March 1966) (CONFIDENTIAL) (PA 22,032).

(For annotation, see I-21.)

- (II-2) MacLeod, K. L., "River Warfare (U)" (AD 827 789 L), from Department of the Navy, U. S. Naval Amphibious School, Coronado, California (July 1966), 48 pp (CONFIDENTIAL) (PA 27,445).

(For annotation, see I-37.)

- (II-3) McClintock, Robert, "The River War in Indochina", United States Naval Institute Proceedings, Vol 80 (12), pp 1303-1311 (December 1954) (UNCLASSIFIED) (PA 30,361).

(U) This is a description of the French riverine operations against the Viet Minh.

- (II-4) "History of Naval Operations Vietnam: 1946 - 1963 (U)", from U. S. Navy, Office Chief of Naval Operations, Naval History Division, Washington, D. C. (June 1964), 247 pp (SECRET) (PA 19,770).

(For annotation, see I-64.)

- (II-5) Pratt, Fletcher, Civil War on Western Waters, Henry Holt & Co., New York (1956) (UNCLASSIFIED).

(U) This book is an authoritative account of the naval war on the Mississippi and its tributaries. Pratt describes the ways the two commands approached the problem. He describes the ships and the tactics of both ship-to-ship battles and ship vs. shore batteries and snipers. There are numerous parallels to present day actions.

- (II-6) Beebe, Robert P., "Operations in Restricted Waters", U. S. Naval Institute Proceedings, pp 23-33 (June 1962) (UNCLASSIFIED) (PA 27,968).

(For annotation, see I-66.)

FOR OFFICIAL USE ONLY

- (II-7) Croizat, Col. V. J., "A Translation From the French: Lessons of the War in Indochina, Volume 2", Report No. RM-5271-PR, Memorandum, The RAND Corporation, Santa Monica, California 90406, Contract No. F44620-67-C-0045 (May 1967), 411 pp (For Official Use Only) (PA 29,740).

(FOUO) "The Lessons of the War in Indochina, originally published in three volumes, is an official document issued by the Commander in Chief, French Forces, Indochina, in May 1955. Volume I is a Top Secret document concerned with high-level politico-military issues. It was distributed to a very small number of officials and is not available. Volumes 2 and 3, originally published under Secret classification, have recently been made available in the United States for Official Use Only. These two volumes are complementary in that Volume 2 is concerned with a summary of the experience of the war and Volume 3 seeks to deduce guidance from this experience that might have application for French forces in similar wars in the future. Because of this, Volume 2 is considered to be of greater interest to American readers. This volume was obviously intended for a military audience with some prior general knowledge of French operations in Indochina, and it was considered desirable that its translation include some explanatory footnotes and be preceded by an introduction containing an historical summary to serve as a frame of reference for the details described in the text."

- (II-8) Marshall, S. L. A., The River and the Gauntlet, Defeat of the Eighth Army by the Chinese Communist Forces, November 1950, in the Battle of the Chongchon River, Korea, William Morrow, New York (1953) 385 pp (UNCLASSIFIED).

(U) This book was not available for review but has been strongly recommended.

- (II-9) Willoughby, Malcom F., Rum War at Sea, Government Printing Office, Washington, D. C. (1964) (UNCLASSIFIED).

(U) This book describes the work of the U. S. Coast Guard in their efforts to control smuggling of alcoholic beverages into the U. S. during the Prohibition Era. Patrols on lakes and rivers are described.

- (II-10) Anderson, Bern, By Sea and By River, The Naval History of the Civil War, New York, Alfred A. Knopf (1962), 303 pp (UNCLASSIFIED).

(U) This book relates courses of battles and actions, including only sufficient tactical details to round out a description of the event. It is an interpretation of the significance of the naval aspects of the Civil War rather than a documentary account.

FOR OFFICIAL USE ONLY

UNCLASSIFIED

- (II-11) Mahan, A. T., "The Gulf and Inland Waters", Part III of The Navy in the Civil War, New York, Charles Scribner's Sons (1883), 267 pp (UNCLASSIFIED).

(U) The volume describes naval operations on the Eastern Seaboard, the Gulf of Mexico from Key West to the mouth of the Rio Grande, and inland on the Mississippi and its tributaries from Cairo, Illinois, to the mouth of the river.

- (II-12) Jones, Virgil Carrington, The Civil War at Sea. March 1862-June 1863 The River War, Volume II, New York, Holt, Rinehart, Winston (UNCLASSIFIED).

(U) This is one of three volumes on the Civil War, but the only one dealing with riverine warfare. This volume has an extensive bibliography.

- (II-13) Crandall, Warren Daniel, History of the Ram Fleet and the Mississippi Marine Brigade in the War for the Union on the Mississippi and Its Tributaries, 2 pts. in 1 volume, St. Louis (1907), 457 pp (UNCLASSIFIED).

(U) This is the story of the Ellet Rams and their men. It was written and published under the auspices of their Society of Survivors.

- (II-14) Brossard, M. de, Dinassaut, DS 550.B7*, Paris, Editions France-Empire (1952) (UNCLASSIFIED).

(U) This is an excellent account of northern river operations by the former commander of 1st Naval Assault Division. The book is now out of print.

- (II-15) Kilian, Robert, Fusiliers-Marins d'Indochine, DS 550.K5*, Paris (1948) (UNCLASSIFIED).

(U) This is an early account of some Marine-type landing operations.

- (II-16) Mauciere, Jean, Marins dans les Arroyos, DS 550.M35*, Paris, Peyronnet (1951) (UNCLASSIFIED).

(U) This is a very vivid account of small-vessel operations on South Vietnamese rivers.

- (II-17) Mordal, Jacques, Marine Indochine (The Navy in Indochina), Paris, Amiot-Dumont (1953) (UNCLASSIFIED).

(U) This is a good account of French naval operations in the Indochina theater. It shows belated emphasis on river operations in support of land movements.

*Library of Congress call number.

UNCLASSIFIED

(II-18) "From the Mekong to the Red River Under the White Kepi", Paris-Match, No. 255, pp 28-37 (February 13-20, 1954) (UNCLASSIFIED).

(II-19) Julien-Binard, Louis, "Souvenirs de Nam-Dinh, Mars 1954", La Revue Maritime**, Paris (December 1956) (UNCLASSIFIED).

(U) This presents a well-documented river operation by the commander of Dinassaut No. 3.

(II-20) "La Marine Francaise en Indochine", La Revue Maritime**, No. 80, 1497-1505 (December 1952) (UNCLASSIFIED).

(II-21) "La Naissance d'une Flottile", La Revue Maritime**, No. 42, 1265-1276 (October 1949) (UNCLASSIFIED).

(II-22) "Les Fusiliers Marins", La Revue Maritime**, No. 30, 1220-1232 (October 1948) (UNCLASSIFIED).

(II-23) Gosnell, H. Allen, Guns on the Western Waters. The Story of River Gunboats in the Civil War, Louisiana State University Press, Baton Rouge (1949), 273 pp (UNCLASSIFIED).

(U) This book tells the story of gunboat warfare mainly on inland waterways during the Civil War. It is a good narrative treatment with many contemporary accounts of actions.

(II-24) Cracknell, LCDR William H. Jr., "The Role of the U. S. Navy in Inshore Waters", Naval War College Review, Vol 21 (3), pp 65-91 (November 1968) (UNCLASSIFIED).

(For annotation, see I-76.)

**La Revue Maritime may be obtained from at least the following libraries:

- (1) Stanford University Library, Hoover Institution on War, Revolution, and Peace
- (2) Library of Congress
- (3) U. S. Army Engineer School Library, Fort Belvoir, Virginia
- (4) New York Public Library.

SECRET

SECTION III

THE RIVERINE ENVIRONMENT (U)

SECRET

SECRET

(This page is Unclassified)

SECTION III

THE RIVERINE ENVIRONMENT (U)

- (III-1) Dosien, R. W., and Thornton, R. M., "Firepower Requirements for Remote Area Combat Logistical Capability in Remote Area Combat. Volume IV: Logistics Capability in Remote Area Combat (U)", Final Report (AD 351 513), from Applied Science Corporation, Santa Paula, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. OSD-SD-128, ARPA Order No. 324 (March 1963) (SECRET) (PA 5287).

(For annotation, see I-3.)

- (III-2) "Tactics and Techniques of Counterinsurgent Operations (U)", from Chief, Military Aid and Assistance Group-Vietnam (July 1, 1963) (CONFIDENTIAL/NOFORN Except Republic of Vietnam and Australian Army Training Team, Vietnam) (PA 5812).

(For annotation, see I-5.)

- (III-3) Bottoms, A. M., and Seawright, J. W., "Riverine Mine Countermeasures in Vietnam - 1964 (U)", Report No. E-80, from Joint Advanced Research Projects Agency/Navy Mobile Technical Analysis Team (MCM), and Research Analysis Corporation, McLean, Virginia, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-212 (April 15, 1964) (CONFIDENTIAL) (PA 7742).

(For annotation, see I-8.)

- (III-4) "Analysis of Geographic and Climatic Factors in Coastal Southeast Asia", Final Report No. 04231-1-F (AD 275 476), from The University of Michigan, College of Literature, Science, and the Arts, Department of Geography, Ann Arbor, Michigan, for Quartermaster Research and Development Command, Environmental Protection Research Division, Natick, Massachusetts, Contract No. DA-19-129-QM-1655 (March 1962) (UNCLASSIFIED) (PA 8530).

(For annotation, see I-9.)

- (III-5) "Lower Mekong River Basin", from U. S. Department of the Interior, Bureau of Reclamation, Washington, D. C., for International Cooperation Administration (March 1956) (UNCLASSIFIED) (PA 14,304).

(U) "In response to a request from the countries of Cambodia, Laos, Thailand, and Vietnam, the U. S. International Cooperation Administration asked the Bureau of Reclamation of the Department of the Interior to make a brief reconnaissance of the lower Mekong River. A group of three engineers spent about 30 days in the Mekong River area looking over the terrain and interviewing officials and technicians. This group was assisted by: (1) the

III-1

SECRET

SECRET

(III-5) (Cont'd) (U) USOM's and officials of the four countries; (2) a small advance party which preceded it to the field by about 30 days and gathered technical data and made arrangements; and (3) one engineer who collected and abstracted available data in Washington, D. C..."

(III-6) Brinton, George, Clare, Kenneth, and Dow, Irving, "Special Study of Mobility in the Mekong Delta Area of Vietnam (U)", Final Report (AD 360 436 L), from Stanford Research Institute, South Pasadena, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., and Office of Naval Research, Washington, D. C., Contract No. Nonr-4194(00), ARPA Order No. 574 (March 1965), 70 pp (SECRET) (PA 16,503).

(S) "This study has been concerned with the identification of techniques and equipments that could be adopted and made available in the immediate time period to produce significant improvements in the mobility of military forces in the Mekong Delta area of South Vietnam. The limitations on mobility imposed by the physical environment in the Delta area have been analyzed in detail. The types of activities in which improved mobility is probably essential to effective Vietnamese counterinsurgent operations have been identified. Alternative types of small craft and off-road vehicle designs have been assessed as to their potential suitability in providing improved mobility in specific types of situations and environments in the immediate time period."

(III-7) "A Comprehensive Evaluation of Thailand's Transportation System Requirements", from Transportation Consultants, Inc., Washington, D. C. (June 1959) (UNCLASSIFIED) (PA 18,589).

(U) This report describes the air, land, and inland waterway transportation facilities of Thailand. It includes a description of the inland waterway system of Thailand.

(III-8) Vogel, Harvey, "An Index of Geographic Research of the Humid Tropic Environment; Volume I, KWIC Index, Humid Tropic Environmental Literature" (AD 625 426), from Texas Instruments, Inc., Dallas, Texas, for Army Research Office, Environmental Division, Regional Branch, Arlington, Virginia, Contract No. DA-49-092-ARO-33 (December 1965) (UNCLASSIFIED) (PA 20,019).

(U) This is a bibliography.

(III-9) "Project PEBBLE. A Study of Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume I: Assumptions, Conclusions and Recommendations (U)", from National Academy of Sciences, National Research Council, Mine Advisory Committee, Washington, D. C. (November 1965) (SECRET/NOFORN) (PA 21,378).

(For annotation, see I-20.)

III-2
SECRET

SECRET

- (III-10) "Tug and Barge Construction Program" (April - June 1965), Preliminary Economic and Engineering Study, from Daniel, Mann, Johnson, and Mendenhall, Saigon, Vietnam, for the Government of Vietnam, and the United States Operations Mission to Vietnam (February 1966), 96 pp (UNCLASSIFIED) (PA 23,032).

(U) This report contains a description of the inland waterway system of the RVN including waterway transport, transport routes, and types of barges and junks in use.

- (III-11) "Development of Harbor Facilities - Basic Information Conditions and Criteria (April - December 1965)", Preliminary Economic and Engineering Study, from Daniel, Mann, Johnson, and Mendenhall, Saigon, Vietnam, for the Government of Vietnam, and the United States Operations Mission to Vietnam, APO, San Francisco, California, Contract No. AID-430-990 (February 1966), 262 pp (UNCLASSIFIED) (PA 23,034).

(U) Environmental conditions of RVN ports and harbors are given, including climate, tides, flooding, etc.

- (III-12) Bontadelli, J. A., Nielsen, K. L., and Virgin, W. P., "Swamp Forest Warfare (U)", Report No. BAT-171-45 (AD 376 328 L), from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-171 (May 16, 1966), 150 pp (SECRET) (PA 24,510).

(For annotation, see I-28.)

- (III-13) Bontadelli, J. A., Nielsen, K. L., and Virgin, W. P., "Swamp Forest Warfare: Summary (U)", Report No. BAT-171-45-1 (AD 376 327 L), from Battelle Memorial Institute, RACTC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-171 (May 16, 1966), 22 pp (SECRET) (PA 24,511).

(For annotation, see I-29.)

- (III-14) Stripling, M. H., "Bottom Sediments in Important Ship Channels of Europe and Asia (U)", Report No. 115, from Department of the Navy, Bureau of Ships, Minesweeping Branch, Washington, D. C. (February 1, 1959) (SECRET) (PA 25,061).

(S) "A sea mine on the ocean floor may lie exposed on a hard sand or coral bottom, it may be partially or wholly submerged in soft mud, or it may lie among rocks which greatly resemble it in size and shape. The effectiveness of mine hunting and, of course, the choice of gear are critically dependent on the ability of equipment to cope with these varying bottom conditions, e.g., to penetrate the mud or to distinguish between the rocks and the mines. Getting the right type of gear to the right

SECRET

- (III-14) (Cont'd) (S) place may therefore hinge to a large extent on a knowledge of the composition of the bottom or the bottom sediments in coastal areas of strategic importance... This report is a first attempt to summarize data on sedimentary deposits in channel approaches to important European and Asian ports... Each chart... also shows the total linear extent of each bottom type for the area represented..."
- (III-15) Marchant, A. A., "Inland Waterways of the Mekong Delta (U)", Report No. R-0352-66, from The American University, Special Operations Research Office, Counterinsurgency Information Analysis Center, Washington, D. C., for Department of the Army, Office of Research and Development, Washington, D. C., and Research Analysis Corporation, Unconventional Warfare Department, McLean, Virginia (February 25, 1966), 24 pp (SECRET/NOFORN) (PA 25,587).
- (U) Section I describes the physical characteristics of Delta waterways; Section II gives statistics on the number of vessels registered with the GVN; and Section III describes the ethnic and cultural characteristics of the people of the Delta area.
- (III-16) Marley, Shyne B., and Denton, Robert W., "Defense Against Underwater Swimmer Attack (U)", U. S. Navy Mine Defense Laboratory, Panama City, Florida, 6 pp (SECRET) (PA 26,096).
- (For annotation, see VIII-11.)
- (III-17) "A Compendium of International Rivers in the ECAFE Region", Report No. E/EN.11/WRD/Conf. 6/L.4, from United Nations Economic and Social Council, Economic Commission for Asia and the Far East, Bangkok, Thailand (October 21, 1964), 100 pp (UNCLASSIFIED) (PA 26,300).

(U) "This compendium on international rivers in the ECAFE region has been compiled on the basis of information gathered from maps, hydrometeorological data, available project reports and related materials. This interim report contains a description, basic data and information on 11 rivers: the Mekong, Red, Brahmaputra, Ganges, Kosi, Gandak, Gogra, Indus, Stulej, Kabul and Helmand. As more data and information become available, three more rivers, viz. the Yalu, Salween and Hari Rud will be included, and the report will be revised accordingly and brought up-to-date from time to time."

SECRET

CONFIDENTIAL

(This page is Unclassified)

- (III-18) Bhangsbha, Sorasan, "Remote Area Water Mobility: Annex to Shallow Draft Boat Report", Report No. 66-029 (AD 809 150), from Joint Thai-U. S. Military Research and Development Center, Bangkok, Thailand, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (December 1966), 29 pp (UNCLASSIFIED) (PA 26,532).

(U) "A survey of 20 major rivers in all parts of Thailand was undertaken to provide data for use in designing boats and other equipment for counter-insurgency operations. Two thousand miles of waterways, some in remote areas of Thailand, were covered by the survey."

- (III-19) "An Engineering Study of the Primary Canal System of South Vietnam With a Preliminary Report on a Reconnaissance of the Saigon Ship Channel", from Daniel, Mann, Johnson, and Mendenhall International, Saigon, Vietnam, Contract No. ICAC-1055 (December 1960), 112 pp (UNCLASSIFIED) (PA 29,378).

(U) The report covers the following work: "...an engineering study of the existing primary canal system; the establishment of a priority system for canal restoration; a hydrographic survey of the top priority canals; the preparation of plans and specifications for dredging the top priority canals; a preliminary study of the Saigon River for channel realignment, and the procurement of personnel, equipment, instruments, and supplies..."

- (III-20) Tselepis, George, "Gulf Coast Visit to the Mississippi Basin for Riverine Applications to Southwest Asia", Informal Report No. 67-21 (AD 813 054 L), from U. S. Naval Oceanographic Office, Washington, D. C. (April 1967), 21 pp (UNCLASSIFIED) (PA 29,686).

(U) "Florida State University, Louisiana State University, U. S. Waterways Experimental Station, and the Mississippi River Commission were visited to determine if certain deltaic processes within the United States could be studied and applied to similar areas in Southeast Asia. Since NAVOCEANO, in the past, has concentrated on coastal and deep sea charting requirements, there exists a lack of knowledge and experience with the unique problems posed by river navigation. Hydrographic survey techniques and equipment used at various institutions were examined for possible application to river and estuary operations."

- (III-21) Bates, Dr. Charles C., Tselepis, George, and Von Nieda, Daniel, "Some Technical Considerations in Producing Special Charts for Rivers and Other Shallow Water Areas", Informal Report No. IR-67-30 (AD 813 777 L), from U. S. Naval Oceanographic Office, Research and Development Department, Washington, D. C. (May 1967), 28 pp (UNCLASSIFIED) (PA 29,688).

CONFIDENTIAL

CONFIDENTIAL

(III-21) (Cont'd) (U) "This paper addresses itself to current-day technical problems that must be solved in order to provide up-to-date, comprehensive information to navigators of river craft. Such problems include rapid fluctuating water levels, frequent changes in channel depth, common occurrences of man-made obstructions, and difficulties associated with navigating small craft in a strange, often hostile area with ill-defined navigational aids, particularly during nighttime hours."

(III-22) Dow, Irving, and Brinton, George, "Mekong Delta River Patrol: An Analysis of River Patrol Operations in Counter-Insurgency Warfare (U)", Draft Report, from Westwood Research, Inc., Los Angeles, California, for Office of Naval Research, Washington, D. C., Contract No. Nonr-4962(00) (December 1966), 106 pp (SECRET) (PA 30,943).

(For annotation, see I-53.)

(III-23) Clark, Dennis K., "Preliminary Discussion of Current Data Collection Systems for Use in Mekong Delta", Report No. IR-67-62 (AD 819 212), from Naval Oceanographic Office, Research and Development Department, Exploratory Oceanography Division, Coastal Oceanography Branch, Washington, D. C., Contract No. 683-FM-DCT (August 18, 1967), 16 pp (UNCLASSIFIED) (PA 30,951).

(U) "The collection of current data in the Mekong Delta poses many difficult problems, primarily due to war conditions and large water level fluctuations. These s limit normal current measurement techniques in most areas. This report briefly discusses initial concepts concerning an underway system for measuring current magnitudes that utilizes a ducted current meter and various positioning devices..."

(III-24) Dow, Irving, and Krisel, Lionel, "A Review of Conditions of Mobility in the Delta Area of East Pakistan (U)", Addendum Report, from Westwood Research, Inc., Los Angeles, California, for Office of Naval Research, Washington, D. C., and Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. Nonr-4194(00), ARPA Order No. 574 (December 1966), 34 pp (CONFIDENTIAL) (PA 31,290).

(C) "The specific objectives of this...study are to make a general characterization of selected geographic conditions in the East Pakistan area, based on existing geographic intelligence, and to relate these findings to those of the Mekong Delta study, identifying similarities and dissimilarities between geographical conditions in the two areas and comparing problems of mobility and potentials for conducting waterborne operations in the two areas."

(U) The Mekong Delta study referred to is item I-53.

CONFIDENTIAL

(This page is Unclassified)

- (III-25) "Accelerated Development, Plain of Reeds Feasibility Study (Preliminary)", from Department of the Army, Engineer Agency for Resources Inventories, Washington, D. C., for Department of Defense, Advanced Research Projects Agency, Washington, D. C., ARPA Order No. 1068 (December 1967) (UNCLASSIFIED) (PA 31,421).

(U) The report contains an excellent physical description of the Plain of Reeds as well as showing its interaction with the Mekong River.

- (III-26) Mairs, Robert, and Bright, Chester, "Potential Uses of a Swimmer Operated Craft in Oceanography and Riverine Warfare (U)", Report No. IR-67-58 (AD 383 730 L), from U. S. Naval Oceanographic Office, Research and Development Department, Coastal Oceanography Branch, Washington, D. C. (August 1967), 13 pp (SECRET) (PA 31,552).

(For annotation, see I-55.)

- (III-27) Salsman, Garrett, and Tolbert, William, "The Apalachicola River: Its Resemblance to the Riviere de Saigon (U)", Final Report No. 333 (AD 382 438 L), from Department of the Navy, U. S. Navy Mine Defense Laboratory, Research and Development, Panama City, Florida, for Department of the Navy, Commander, Naval Ship Systems Command, Washington, D. C. (June 1967), 46 pp (CONFIDENTIAL) (PA 31,736).

(U) "Recent military developments in Southeast Asia have extended the mission of the Navy's mine and swimmer countermeasures forces into the relatively unfamiliar riverine environment, which requires new countermeasures equipment and operational doctrine. Because of the difficulty of testing and evaluating equipment in a war theater, alternate test areas similar to the operational area are sought. During July 1966, several small boat sonars were tested in the Apalachicola River in Florida, near the Gulf of Mexico. Environmental conditions determined during these tests included bathymetry, channel configuration, bank and bottom conditions, water temperature, visibility, salinity, sound velocity, particulate matter content, currents, water level fluctuations, and weather. Comparison of the data obtained during this survey with that available for South Vietnam suggests that the Apalachicola River is more similar to the secondary waterways of South Vietnam, where most mining incidents have been reported, than to the Riviere de Saigon proper."

CONFIDENTIAL

CONFIDENTIAL

- (III-28) "Viet Cong Use of Oriental and Occidental Rivers (U)", Report No. 66-11, from Headquarters, Armed Forces of Republic of Vietnam, Office of Joint General Staff, J2, and Headquarters, U. S. Military Assistance Command-Vietnam, Office of Assistant Chief of Staff, Combined Intelligence Center, Vietnam, APO, San Francisco, California, for Advanced Research Projects Agency, R&D Field Unit-Vietnam, APO, San Francisco, California (Rec'd. April 9, 1968), 15 pp (CONFIDENTIAL/NOFORN except Republic of Vietnam, Australia, New Zealand, and The Republic of Korea) (PA 32,240).

(For annotation, see I-60.)

- (III-29) "Special Study of Mobility in the Mekong Delta Area of South Vietnam (U)", Report No. RAC-64-2704, from Stanford Research Institute, Southern California Laboratories, South Pasadena, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. Nonr-4194(00), ARPA Order No. 574 (December 1964), 44 pp (SECRET) (PA 12,789).

(U) This report includes a description of the environment in the Delta area of the RVN.

- (III-30) "History of Naval Operations Vietnam: 1946 - 1963 (U)", from U. S. Navy, Office Chief of Naval Operations, Naval History Division, Washington, D. C. (June 1964), 247 pp (SECRET) (PA 19,770).

(For annotation, see I-64.)

- (III-31) Clark, Dorothy K., and Giarratana, Angelo C., "Transportation Systems of Thailand", Report No. RAC-TP-180(FOT) (AD 484 200), from Research Analysis Corporation, McLean, Virginia, for Advanced Research Projects Agency, Washington, D. C., Contract No. DA-49-083-OSA-3107 (June 1966), 105 pp (UNCLASSIFIED) (PA 22,678).

(U) A portion of this report is devoted to describing the inland waterway system and native boats of Thailand.

- (III-32) Harvel, K. W., and Stokes, R. H., "A Summary of Hydrographic Data for Acoustic Mine Hunting in Several Foreign Harbors (U)", Report No. DRL-A-165, from The University of Texas, Defense Research Laboratory, Austin, Texas, for Department of the Navy, Office of Naval Research, Bureau of Ships, Washington, D. C., Contract No. NObsr-72627 (December 18, 1959), 24 pp (CONFIDENTIAL) (PA 24,837).

(C) "Utilizing information obtained from a collection of nautical charts and other publications of the U.S. Navy Hydrographic Office, an attempt has been made to summarize hydrographic data for a number of foreign harbors of strategic importance to U. S. military interest. Within severe limitations imposed by the present state of the literature, the summaries undertaken represent "descriptions" of hydrographic environments which are to be encountered in providing for the

CONFIDENTIAL

CONFIDENTIAL

(III-32) (Cont'd) (C) maintenance of cleared entry to these harbors under conditions of mine warfare. The hydrographic parameters considered in this program are just those specifically relevant to the problem of achieving optimum design characteristics and operational directives for acoustic mine hunting systems. Published data have been summarized for a total of 117 foreign harbors..."

(III-33) "Research Report on the Plain of Reeds", from Republic of Vietnam Armed Forces, Combat Development and Test Center, Vietnam (April 21, 1966), 36 pp (UNCLASSIFIED) (PA 26,632).

(U) This report is in eight parts, each covering an area of military significance: Geographic Characteristics; Topographical Characteristics; Network of Rivers and Manmade Canals; Climate; Hydrology; Soils; Vegetation, Crops, and Livestock; and Means of Transportation in the Plain.

(III-34) "Classification of Inland Waterways", from Economic Commission for Asia and the Far East Inland Transport and Communications Committee, Inland Waterway Sub-Committee, Bangkok, Thailand (October 31, 1962), pp 11-30 (UNCLASSIFIED) (PA 31,058).

(U) This report reviews the characteristics of the inland waterways and water craft in Burma, Cambodia, India, Laos, Pakistan, Thailand, and South Vietnam.

(III-35) Spinning, John N., Fletcher, James P., and Sproull, Charles B., "Test and Evaluation of Five Portable Recording Echo-Sounders for Riverine Applications", Report No. IR-68-13, from Naval Oceanographic Office, Research and Development Department, Hydrographic Development Division, Charting Techniques Branch, Washington, D. C. (March 1968), 66 pp (FOR OFFICIAL USE ONLY) (PA 32,789).

(FOUO) "A series of static and dynamic tests of five possible recording echo-sounders were made to determine their operational characteristics, accuracy, minimum depth resolution, and general suitability as standby or back-up equipment for the conventional depth recording units being employed by the Naval Oceanographic Office Riverine Survey Team in Vietnam... Each of these lightweight and relatively inexpensive echo-sounders is an off-the-shelf item and readily available in quantity. All models tested were subjected to the identical environmental conditions to assure an unbiased conclusion."

CONFIDENTIAL

CONFIDENTIAL

(This page is Unclassified)

- (III-36) Smith, Albert C., Jr., "Rung Sat Special Zone, Vietnam's Mekong Delta", U. S. Naval Institute Proceedings, Vol 94 (4), pp 116-121 (April 1968) (UNCLASSIFIED) (PA 32,298).

(U) This report presents a good unclassified description of the area and its importance to the RVN.

- (III-37) "A Study of Mine and Mine Countermeasures Operations in Guerrilla Warfare: Project PEBBLE (U)", Final Report No. NRC:MAC:2019, Volume II, from National Academy of Sciences, National Research Council Mine Advisory Committee, Washington, D. C., for Office of Naval Research, Washington, D. C., and Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. 2300(10) (March 1968), 501 pp (SECRET/NOFORN) (PA 32,728).

(For annotation, see I-73.)

- (III-38) Reid, George K., Ecology of Inland Waters and Estuaries, Reinhold Publishing Corporation, New York, New York (1961) (UNCLASSIFIED).

(U) This book is an introductory textbook to the elemental factors and processes that operate in lakes, streams and estuaries as dynamic systems. It is divided into five parts: I-Origins of lake basins and stream and estuary channels; II-The nature of water; III-Physical and chemical characteristics of natural water; IV-Plants and animals that have become adapted to lakes, streams, and estuaries; and V-Population and community organization principles.

- (III-39) Lauff, George H., "Estuaries", American Association for the Advancement of Science, Washington, D. C. (1967) (UNCLASSIFIED).

(U) This is a collection of papers presented at a Conference on Estuaries held in Georgia in 1964. Physical Factors, Geomorphology, Sediments and Sedimentation, Microbiota, Nutrients and Biological Production, Ecology and Populations, Physiology and Evolution, Fisheries, and Human Influences are the subject headings in the book. This is a very comprehensive collection.

- (III-40) Dow, Irving, Brinton, George, and Krisel, Lionel, "Analysis of Potential Requirements for Counterinsurgent River Warfare Operations in Laos (U)", prepared for Office of Naval Research and Naval Research Laboratory, Washington, D. C., by Westwood Research, Inc. (June 1967) (CONFIDENTIAL) (PA 34,022).

(For annotation, see I-74.)

CONFIDENTIAL

UNCLASSIFIED

(III-41) Singer, Floyd L., "First Interim Report on Shallow-Water Antisubmarine Warfare. Volume 4. Environmental Data on Selected Shallow-Water Areas (U)", Report Nos. NAVWEPS-8786, and NOTS-TP-3877 (AD 371 328 L), from U. S. Naval Ordnance Test Station, Weapons Planning Group, China Lake, California, for Department of the Navy, Bureau of Weapons, Washington, D. C. (December 1965), 278 pp (CONFIDENTIAL/NOFORN) (PA 28,195).

(For annotation, see V-56.)

III-11 and III-12

UNCLASSIFIED

CONFIDENTIAL

SECTION IV

MINE WARFARE IN INLAND/INSHORE WATERS (U)

CONFIDENTIAL

CONFIDENTIAL

SECTION IV

MINE WARFARE IN INLAND/INSHORE WATERS (U)

- (IV-1) Johnson, James W., "River and Canal Ambush Problems, Republic of Vietnam, 1962 (U)", Report No. RAC-SP-4(SEA) (AD 337 811 L), from Research Analysis Corporation, McLean, Virginia, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. DA-44-188-ARO-1 (April 1963), 57 pp (SECRET) (PA 149).

(For annotation, see I-1.)

- (IV-2) Wise, W. P., "The Vulnerability of Landing Craft to Small Ground Mines (U)", Report No. UERD-2-59 (AD 308 982), from Norfolk Naval Shipyard, Underwater Explosions Research Division, Portsmouth, Virginia, for Department of the Navy, Washington, D. C. (April 1959), 98 pp (CONFIDENTIAL) (PA 5206).

(For annotation, see I-2.)

- (IV-3) Bottoms, Albert M., "A Survey of River Minecountermeasures for Use in Remote Area Conflict, A Preliminary Report (U)", Research Analysis Corporation, for the Advanced Research Projects Agency, Office of Secretary of Defense, Contract No. SD-212, ARPA Cont. No. 10020, RAC 63-2791 (November 15, 1963) (SECRET) (PA 5434).

(For annotation, see I-4.)

- (IV-4) Daly, E. F., "Report on Trip to South Vietnam (U)", from U. S. Naval Explosive Ordnance Depot Facility, U. S. Naval Propellant Plant, Indian Head, Maryland, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (March 23, 1964) (CONFIDENTIAL) (PA 6820).

(For annotation, see I-6.)

- (IV-5) "Riverine Mine Warfare (U)", Department of the Army Teletype Message DTG 260235Z Mar 64, DA IN 247009-C, from Commander U. S. Military Advisory Command, Vietnam, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C. (March 26, 1964), 1 p (CONFIDENTIAL) (PA 7156).

(C) This message describes the circuitry of command detonators for water mines.

CONFIDENTIAL

- (IV-6) Bottoms, A. M., and Seawright, J. W., "Riverine Mine Countermeasures in Vietnam - 1964 (U)", Report No. E-80, from Joint Advanced Research Projects Agency/Navy Mobile Technical Analysis Team (MCM), and Research Analysis Corporation, McLean, Virginia, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-212 (April 15, 1964) (CONFIDENTIAL) (PA 7742).

(For annotation, see I-8.)

- (IV-7) Cole, R. H., Underwater Explosions, Princeton University Press, Princeton, New Jersey (1948) (UNCLASSIFIED) (PA 8189).

(U) This is a textbook treatment of the subject.
It contains a great deal of detailed information
on the results of underwater explosions.

- (IV-8) Sniffin, Millard T., "Proposed Mechanical Minesweeping System for Use by LCV's to Sweep Controlled Mines in Rivers and Canals (U)", Preliminary Draft, from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Bureau of Ships, Washington, D. C. (October 1964) (CONFIDENTIAL) (PA 12,008).

(C) "A chain drag mechanical sweep that had been reported as unsatisfactory by the Vietnam Navy has been redesigned to the extent that it is effective in waters to a depth of 30 feet at speeds above 4 knots. Special handling gear, that permits launching or recovery of the chain drag without exposure of operating personnel, has been designed and tested. At speeds above 4 knots the chain drag has severed simulated moorings up to 5/32 inch diameter stainless steel wire rope with a rated breaking strength of 3300 pounds. Tow tests were conducted on hard sand bottoms, soft mud bottoms, and soft mud interlaced with tree roots. It is concluded that this gear is suitable for clearance of firing leads of moored or bottom mines that are electrically fired from the banks of rivers and canals in Vietnam."

- (IV-9) McKeethan, L. W., "Technical Review of Mine Warfare (U)", Report No. 54 (AD 329 786), from Yale University, Laboratory of Marine Physics, New Haven, Connecticut, for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-609(02) (September 30, 1961) (CONFIDENTIAL) (PA 12,311).

(C) This study "begins with a chronological survey... of the progress of sea mine warfare from a simple beginning to its distressingly complicated present status. This is followed by sections on mines and mining, on ships and ship-to-mine communications, on mine countermeasures, on mine warfare environment, (and) on preparation for mine warfare". The reference does not speak directly to riverine mine warfare but is very valuable background on mine warfare in general.

CONFIDENTIAL

CONFIDENTIAL

- (IV-10) Daly, E. F., "Evaluation of Minneapolis Honeywell Model 1B Sea Scanar (Small Boat Sonar) (U)", Report No. NAVEODFAC-126 (AD 356 997 L), from U. S. Naval Explosive Ordnance Disposal Facility, Indian Head, Maryland, for Department of the Navy, Bureau of Naval Weapons, Washington, D. C. (December 18, 1964), 25 pp (CONFIDENTIAL) (PA 13,382).

(For annotation, see IX-4.)

- (IV-11) Arbuthnot, G. L., III, "Magnetic Object Proximity Indicator Investigation (U)", Interim Report (AD 334 285 L), from U. S. Navy Mine Defense Laboratory, Panama City, Florida (July 1962), 13 pp (CONFIDENTIAL) (PA 13,527).

(U) "The present capability of the AN/UQS-1 mine detecting sonar to vector a vehicle to a mine size target is limited by range resolution. For systems which depend upon a destructor vehicle to neutralize mines by use of a certain amount of high explosives, the vehicle must be placed within the required neutralization distance or the system is useless. Vertical field gradiometers were investigated as a means to insure a target proximity of 10 feet as required by the S-102 system. Simple dipole theory is not valid for ranges less than 13 feet from the average size mine; thus a study was made to find some signature characteristic common to all angles of attack. The "Negative Peak Point Method" seemed best for an expendable destructor type vehicle which has a maximum neutralization distance of 10 feet (75 pounds of HBX-1)."

- (IV-12) Simpson, I. C., "Quick Fix (NEL Problem E4135) (AN/SQS-37(XN-1)) (U)", Report No. 116, from U. S. Navy Electronics Laboratory, San Diego, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (April 8, 1965), 5 pp (CONFIDENTIAL) (PA 16,803).

(For annotation, see IX-7.)

- (IV-13) Warner, H. L., Murphree, F. J., Jr., and Hiller, G. W., "Preliminary Investigations of Methods for Determining Location and Moment of a Magnetic Dipole Using Magnetic Field Measurements (U)", Report No. S-2 (AD 325 131 L), from U. S. Navy Mine Defense Laboratory, Panama City, Florida (October 7, 1959) (CONFIDENTIAL) (PA 17,525).

(C) "Magnetic detectors are used in mine hunting to supplement sonic detectors when water conditions or bottom conditions are found to be unfavorable for acoustic methods. At present, only short range magnetic detectors are in service use. The disadvantage of using such detectors lies in the number of detectors required to obtain an adequate path width from the search array. A preliminary investigation into the potentialities of extending the range of detection of magnetic detectors has revealed several new and interesting concepts which can probably be applied to make possible a single detector locator system for mine hunting..."

CONFIDENTIAL

- (IV-14) Thompson, T. R., "Combat Operations After Action Report and Report on Ambush of Naval Forces", enclosure to Director, R&D Field Unit-Vietnam, Memorandum for the Director, Remote Area Conflict (July 15, 1965) (UNCLASSIFIED) (PA 17,597).

(For annotation, see I-14.)

- (IV-15) Dunning, Bruce B., "Summary Statistics on VC River Incidents FY 1965 (U)", from Advanced Research Projects Agency, R&D Field Unit-Vietnam, APO 143, San Francisco, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Joint Research and Test Activity, APO, San Francisco, California 96309 (August 20, 1965) (CONFIDENTIAL) (PA 18,223).

(For annotation, see I-15.)

- (IV-16) "Riverine Mine Countermeasure Quick Fix Program; Electromagnetic Detonation Phase, Final Report (January 1 - June 30, 1965) (U)", from U. S. Naval Weapons Laboratory, Dahlgren, Virginia, for Department of the Navy, Bureau of Naval Weapons, Washington, D. C. (June 1965) (CONFIDENTIAL) (PA 18,697).

(U) "The objective of this study was to investigate the possibility of using rf energy to remotely initiate the Viet Cong moored underwater mines..."

- (IV-17) Bottoms, A. M., and Seawright, J. W., "Mine Countermeasures Operations in Counterinsurgency (U)", from Research Analysis Corporation, McLean, Virginia, Weapons Systems Evaluation Group, Washington, D. C., and U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Office of the Secretary of Defense, Advanced Research Projects Agency, Office of the Director of Defense Research and Engineering, Washington, D. C. (January 1965) (CONFIDENTIAL) (PA 19,042).

(C) "A potentially key problem in mine countermeasures arises in the conduct of counterinsurgency operations. This paper will review the general background of the counterinsurgency problem as it appears to exist in the 1965-1980 time period, relate mine countermeasures requirements to the world-wide counterinsurgency problem, show by means of a case study a current effort in mine countermeasures in the counterinsurgency environment of Viet Nam, and discuss potential implications to operations and to research and development that may arise from U. S. participation in counterinsurgency operations."

- (IV-18) Rieke, Norbert A., Dunning, Bruce B., and Quynh, Pham-Ngoc, "Riverine Mine Hunting and Sweeping Equipment (U)", Final Report (AD 368 020), from Republic of Vietnam Armed Forces, Combat Development Test Center, Vietnam, and Advanced Research Projects Agency, R&D Field Unit-Vietnam, APO 143, San Francisco, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (October 1, 1965), 139 pp (CONFIDENTIAL) (PA 19,502).

CONFIDENTIAL

CONFIDENTIAL

- (IV-18) (Cont'd) (C) "...The purpose of this evaluation was to determine the suitability and operational effectiveness of the AN/SQS 37(XN) sonar and the U. S. developed riverine minesweeping gear in the counterinsurgency environment of Vietnam. The evaluation consisted of qualitative evaluation of the capability of the Vietnamese Navy to manufacture, install, maintain and operate the AN/SQS 37 (XN) sonar and the U. S. minesweeping equipment and semi-controlled quantitative testing of the two equipments, supported by qualitative observation, to determine the effectiveness of the equipment..."
- (IV-19) "Navy Mine Defense Laboratory Comments on Joint Research and Test Activity Report on Riverine Sonar; Forwarding of (U)", from Commanding Officer and Director, U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Office of the Secretary of Defense, Director, Advanced Research Projects Agency, Washington, D. C. (December 29, 1965), 3 pp (CONFIDENTIAL) (PA 19,957).
- (For annotation, see IX-11.)
- (IV-20) Brinton, G., Clare, K., and Dow, I., "Analysis of Naval Involvement in Counterinsurgency Operations (U)", Final Report, Stanford Research Institute, Southern California Laboratories, South Pasadena, California (April 1965), 78 pp (SECRET) (PA 20,215).
- (For annotation, see I-18.)
- (IV-21) Silvers, J. P., "Assault-Minesweep System Study (U)", Report No. RAD-SR-62-194 (AD 332 826), from AVCO Corporation, Research and Advanced Development Division, Wilmington, Massachusetts, for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-3862(00) (October 30, 1962), 240 pp (CONFIDENTIAL) (PA 20,738).

(C) This report is concerned with minesweeping in harbors and offshore from beaches selected for amphibious assault. Research included the following:

- "1. A theoretical study to determine the feasibility of various high-speed vehicles such as helicopters, hydrofoils, planing hulls, hydrokeels, and ground effect machines for performing influence and mechanical assault minesweeping.
- "2. Consider the craft relative to speed, maneuverability, endurance, influence signature, vulnerability, drawbar pull, independent navigation, sea-state limitations, electronics, habitability, and self-defense.
- "3. Consider the interface problems of minesweeping gear, support vessel requirements and operational techniques to be used with the various vehicles.

CONFIDENTIAL

- (IV-21) (Cont'd) (C) "The scope was further defined to include only shipborne-minesweeping vehicles. Mine hunting was eliminated from consideration on the basis of its questionable value in the classic pre-assault and assault phases of mine countermeasures."
- (IV-22) Maine, W. O., "Mine Hunting Target Classification and Localization Techniques for Magnetic Anomaly Detectors (U)", Interim Report No. i-88 (AD 368 936), from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Bureau of Ships, Washington, D. C. (December 1965), 135 pp (CONFIDENTIAL) (PA 21,377).
- (U) This report discusses the results of initial studies on three possible techniques for either classifying or locating targets detected by magnetic anomaly detectors.
- (IV-23) "Project PEBBLE. A Study of Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume I: Assumptions, Conclusions and Recommendations (U)", from National Academy of Sciences, National Research Council, Mine Advisory Committee, Washington, D. C. (November 1965) (SECRET/NOFORN) (PA 21,378).
- (For annotation, see I-20.)
- (IV-24) Jeffress, Lloyd A., Goodnow, Robert K., and Hafter, Ervin R., "A Remote-Controlled Mine-Disposal Boat (U)", Report No. DRL-242 (AD 363 675 L), from The University of Texas, Defense Research Laboratory, Austin, Texas, for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-3579(01) (June 9, 1965) (CONFIDENTIAL) (PA 21,953).
- (U) "This report describes a radio-controlled boat for use in marking an underwater sonar contact for later disposal, either by divers or by a small explosive delayed-action charge."
- (IV-25) "Project PEBBLE. Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume III: Bibliography (U)", Final Report No. NRC:MAC:2019 (AD 371 950 L), from National Academy of Sciences, National Research Council, Mine Advisory Committee, Project PEBBLE Study Group, Washington, D. C. (March 1966) (CONFIDENTIAL) (PA 22,032).
- (For annotation, see I-21.)
- (IV-26) Chappelle, Dickey, "Water War in Vietnam", National Geographic, Vol 129 (2), pp 272-296 (February 1966) (UNCLASSIFIED) (PA 22,315).
- (For annotation, see I-22.)

CONFIDENTIAL

CONFIDENTIAL

(This page is Unclassified)

- (IV-27) Brown, E. W., "Summary, V. C. Incidents Against Boats, 1963 (U)", Report No. CINCPAC 5604, from Commander in Chief Pacific, FPO, San Francisco, California, for Battelle Memorial Institute, RACIC, Columbus, Ohio (May 18, 1966), 6 pp (SECRET) (PA 22,316).

(For annotation, see I-23.)

- (IV-28) "Mines and Booby Traps Used by the Viet Cong in South Vietnam, English Volume" (AD 482 404), from Assistant Chief of Staff for Intelligence (Army), Washington, D. C. (November 1965) (UNCLASSIFIED) (PA 23,634).

(U) This volume describes some of the water mines used by the VC.

- (IV-29) Brumbaugh, D. A., Kirkland, J. T., and Muller, J. A., "Analysis of Threat in Inshore Undersea Warfare (U)", Report No. 259 (AD 359 248 L), from Operations Research, Inc., Silver Spring, Maryland, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. N0bsr-89164 (January 20, 1964), 84 pp (SECRET) (PA 23,791).

(For annotation, see I-25.)

- (IV-30) "Project MONTE - Sea Mine Countermeasures. Volume III: Partial Bibliography on Sea Mine Countermeasures (U)", Final Report, from National Academy of Sciences, National Research Council, Mine Advisory Committee, Washington, D. C. (February 1958) (CONFIDENTIAL) (PA 23,981).

(U) "This bibliography was prepared during the course of the Project MONTE study which was carried out for the Navy during the summer of 1957 under the auspices of the...Mine Advisory Committee, with the support of the Office of Naval Research. It is not a complete nor a selective listing of the documents relating to sea mine countermeasures but it is perhaps the most up-to-date, comprehensive, compilation within recent years. For this reason, it is being made available to authorized activities..." The citations are not annotated and many are outdated, but some are of value. See also IV-46.

- (IV-31) Ramsay, B. P., "The Proceedings of the Second Technical Conference on the Naval Minefield: Environmental Effects (U)" (January 26-27, 1959), Report No. NAVORD-6200, from U. S. Naval Ordnance Laboratory, White Oak, Maryland (March 31, 1959) (SECRET) (PA 24,307).

(U) There is some discussion of beach and harbor minefields in this document.

- (IV-32) Ramsay, B. P., "Proceedings of the Sixth Conference on the Naval Minefield. Volume I: The Supplement - Small Mines (U)" (January 28-29, 1963), Report No. NOLTR-63-63, from U. S. Naval Ordnance Laboratory, White Oak, Maryland (June 14, 1963) (SECRET) (PA 24,308).

(U) This document, as well as the following two, contains a number of significant papers concerning mines in inland/inshore waters.

CONFIDENTIAL

- (IV-33) Ramsay, B. P., "Proceedings of the Seventh Conference of the Naval Minefield: Its Objectives. Volume I: The Session (January 27-28, 1964) (U)", Report No. NOLTR-64-64, from U. S. Naval Ordnance Laboratory, White Oak, Maryland (March 31, 1964) (SECRET) (PA 24,309).

(U) See item IV-32.

- (IV-34) Ramsay, B. P., "Proceedings of the Sixth Conference on the Naval Minefield: Small Mines. Volume I: The Sessions (U)" (January 28-29, 1963), Report No. NOLTR-63-63, from U. S. Naval Ordnance Laboratory, White Oak, Maryland (March 29, 1963) (SECRET) (PA 24,310).

(U) See item IV-32.

- (IV-35) "Beach Minefield Clearance in Amphibious Operations (U)", Final Report No. MOOR-02-7 (AD 16 986), from American Power Jet Company, Marine Office of Operations Research, Ridgefield, New Jersey (March 1953), 156 pp (CONFIDENTIAL) (PA 24,369).

(C) This report constitutes "a comprehensive review and analysis of the beach minefield problem..." It covers "enemy mines and minefields, minefield lethality, minefield clearing equipment and the tactics and techniques of its use, reconnaissance, tactics of minefield penetration, and other related topics."

- (IV-36) Sniffin, Millard T., "A Trawl Net for Sweeping Bottom Mines", Report No. 298 (AD 488 014), from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Bureau of Ships, Washington, D. C (July 1966), 33 pp (UNCLASSIFIED) (PA 24,813).

(U) "The technique of towing a net from a single small vessel has been developed for the clearance of bottom mines from areas that are relatively level and uncluttered with heavy debris. An inexpensive net, fabricated of nylon line, wire rope, and chain has been developed. The net described herein has proven to be rugged, easy to repair, simple to fabricate and towable by a single small naval craft or an existing commercial trawler."

- (IV-37) "Evaluate for Service Use the Ordnance Locator Mark 9 Mod 0 (U)", Final Report (AD 368 828 L), from U. S. Naval Base, Commander, Operational Test and Evaluation Force, Norfolk, Virginia, for Department of the Navy, Office of Naval Operations, Washington, D. C. (January 6, 1960), 29 pp (CONFIDENTIAL) (PA 24,896).

(C) "The Ordnance Locator Mk 9 Mod 0 is a portable, diver carried device for detecting metal-cased ordnance at short ranges, in beach sand or underwater

CONFIDENTIAL

- (IV-37) (Cont'd) (C) where the item is on the bottom or buried in the bottom. This report presents the results of tests...to determine if the Ordnance Locator...will provide Explosive Ordnance Disposal Units and Underwater Demolition Teams with a means of detecting metallic objects..."
- (IV-38) "Lessons Learned No. 47: River Assault Group Operations (U)", from Headquarters, U. S. Military Assistance Command, Vietnam, APO, San Francisco, California 96243 (March 30, 1965), 14 pp (CONFIDENTIAL/MODIFIED HANDLING AUTHORIZED) (PA 24,919).

(For annotation, see I-31.)

- (IV-39) Manny, P. A., and Clifford, N., "Summary of Experimental Information on Surface Ship Damage From Underwater Explosions. Part I (U)", Report No. C-1510 (AD 373 577), from Department of the Navy, David Taylor Model Basin, Washington, D. C. (October 1963), 405 pp (CONFIDENTIAL/FORMERLY RESTRICTED DATA) (PA 25,027).

(U) Parts of this report describe damages to small craft (See IV-44).

- (IV-40) Stripling, M. H., "Bottom Sediments in Important Ship Channels of Europe and Asia (U)", Report No. 115, from Department of the Navy, Bureau of Ships, Minesweeping Branch, Washington, D. C. (February 1, 1959) (SECRET) (PA 25,061).

(For annotation, see III-14.)

- (IV-41) "A Handbook of U. S. Naval Systems and Operations (U)", Report No. ONR-ACR-NAR-30, from Department of the Navy, Office of Naval Research, Naval Analysis Group, Washington, D. C. (June 1965) (SECRET/NOFORN) (PA 25,120).

(For annotation, see I-33.)

- (IV-42) Crispen, Robert E., et al., "Analysis of Possible Developments in Mine Countermeasures for Inland Waterways (U)", Final Report No. MDL-303 (AD 374 770 L), from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Naval Ship Systems Command, Washington, D. C. (August 1966), 182 pp (CONFIDENTIAL) (PA 25,996).

(U) "This report presents the recommendations of a Riverine Mine Warfare Study Group established at the Laboratory to define the most timely and effective developments which should be undertaken to provide an adequate mine countermeasures capability in inland waterways in South Viet Nam or other areas in which counterinsurgency operations may be undertaken..."

CONFIDENTIAL

CONFIDENTIAL

- (IV-43) "Acoustic Guidance for a Mine Neutralization Vehicle (U)", Report No. 3153 (AD 374 875 L), from Aerojet-General Corporation, Von Karman Center, Oceanic Products Division, Azusa, California, for U. S. Navy Mine Defense Laboratory, Panama City, Florida, Contract No. N600(61331)-63318 (March 1966) (CONFIDENTIAL) (PA 26,001).

(C) "An experimental and analytical investigation has established the technical and operational feasibility of an acoustic guidance system for an underwater, self-powered, free-running mine neutralization vehicle. Three essential acoustic elements of the system were tested and their ability demonstrated to fulfill the homing, localization, and search requirements for mine neutralization vehicle guidance. Based on the performance of these elements, requirements for initial guidance, logic functions, search programing, and bottom-following were determined, and the operational characteristics of the guidance system were defined. Further development of the guidance system as part of a program for the development of a prototype mine neutralization vehicle is recommended."

- (IV-44) Clifford, Norman, and Manny, Paul A., "Summary of Experimental Information on Surface Ship Damage From Underwater Explosions. Part II (U)", Report No. C-1511, from Department of the Navy, David Taylor Model Basin, Structural Mechanics Laboratory, Washington, D. C. (May 1963) (SECRET) (PA 26,236).

(U) Some information is given on damage to small craft. See also IV-39.

- (IV-45) Hawkins, Jackson T., and Hirsch, Arthur E., "Protection for Minesweeper Personnel: The Shock-Attenuating Deck Pad (U)", Report No. C-2265 (AD 377 593), from Department of the Navy, David Taylor Model Basin, Structural Mechanics Laboratory, Washington, D. C., for Department of the Navy, Bureau of Ships, Washington, D. C. (October 1966), 25 pp (CONFIDENTIAL) (PA 26,690).

(U) "The shock environment on a minesweeper during a near-lethal attack from an underwater explosion is described, and protection for standing men against such an attack is evaluated."

- (IV-46) Gibson, Jack R., and Cain, Mercedes, "Project MONTE, Sea-Mine Countermeasures. An Annotated Bibliography (U)" (AD 377 553), from The Library of Congress, Science and Technology Division, Washington, D. C., for Department of the Navy, Office of Naval Research, Washington, D. C. (April 1966), 162 pp (CONFIDENTIAL) (PA 26,692).

(U) "The bibliography presents abstracts of all of the Project MONTE reports classified through CONFIDENTIAL which are listed in the publication cited below, and which have been made available through the MAC Library. No attempt has been made to

CONFIDENTIAL

(IV-46) (Cont'd) (U) search other collections for MONTE reports not at MAC. While a preliminary effort has been made toward compiling a more extensive and up-to-date bibliography on the subject of sea-mine countermeasures and harbor defense, at the present time the work has been suspended because of lack of funds..."

(U) The publication "cited" is IV-30.

(U) See Volume II, below. This includes the SECRET publications listed in IV-30.

(IV-47) Gibson, Jack R., and Cain, Mercedes, "Project MONTE, Sea-Mine Countermeasures, Part II: An Annotated Bibliography (U)" (AD 377 554), from The Library of Congress, Science and Technology Division, Washington, D. C., for Department of the Navy, Office of Naval Research, Washington, D. C. (June 1966), 146 pp (SECRET) (PA 26,698).

(U) See IV-46.

(IV-48) Burt, H. R., Eby, C. L., and Gollobin, L. P., "Appraisal of Explosive Line Charges for Mine Clearance (U)", Report No. 113 (AD 378 340 L), from Presearch, Inc., Silver Spring, Maryland, for U. S. Naval Air Systems Command, Mine Warfare Projects, Washington, D. C., Contract No. NOW-65-0654-C (June 30, 1966) (SECRET/NOFORN) (PA 27,347).

(For annotation, see V-21.)

(IV-49) "Shallow-Water Naval Warfare-Analysis of Threats and Capabilities (U)", Report No. NRC-MAC-2025 (AD 378 140 L), from National Academy of Sciences, National Research Council, Mine Advisory Committee, Washington, D. C., for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-2300(10) (November 1966), 102 pp (SECRET/NOFORN) (PA 27,453).

(For annotation, see I-38.)

(IV-50) Sherman, Walter R., "A Towed Underwater Vehicle System (U)", Interim Report No. i-105 (AD 375 280), from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Naval Ship Systems Command, Washington, D. C. (August 1966), 25 pp (CONFIDENTIAL) (PA 28,082).

(C) "...A bottom-following, self diverting vehicle has been developed to provide a stable operating platform for mine hunting detection and neutralization systems. A three-vehicle array system with automatic spacing controls has been successfully tested at speeds up to 10 knots. A brief description of the system is presented together with operational performance results, photographs, and illustrations..."

CONFIDENTIAL

- (IV-51) Koesy, C. B., et al., "An Assessment of Sonar for the Riverine Environment (U)", Interim Report No. i-113 (AD 378 920 L), from U. S. Navy Mine Defense Laboratory, Panama City, Florida (January 1967), 62 pp (CONFIDENTIAL) (PA 29,685).

(For annotation, see IX-24.)

- (IV-52) "Evaluate the AN/SQS-19 Mine Detecting Set (U)", Final Report (AD 368 827 L), from Department of the Navy, U. S. Naval Operational Test and Evaluation Force, Norfolk, Virginia, for Chief of Naval Operations, Washington, D. C. (June 24, 1960), 49 pp (CONFIDENTIAL) (PA 30,156).

(For annotation, see IX-25.)

- (IV-53) "Mine Neutralization System Feasibility Study (U)", Final Report No. 2840 (AD 349 951 L), from Aerojet-General Corporation, Van Karmen Center, Oceanic Products Division, Azusa, California, for Department of Navy, U. S. Navy Mine Defense Laboratory, Panama City, Florida, Contract No. N600(24)-59882 (March 30, 1964), 21 pp (CONFIDENTIAL) (PA 30,307).

(C) "A feasibility study of a free-running submersible vehicle system for neutralization of bottom laying mines was conducted. A mechanical type bottom follower for the vehicle was assembled in a vehicle and tested. Acoustic guidance methods for the vehicle launch and search modes were selected, analyzed, tested and determined to be feasible. Active electromagnetic (EM) methods for proximity detection of mines were studied and tested...System considerations are discussed and recommendations for follow-on work are made."

- (IV-54) "Conduct an Operational Evaluation of Mine Hunting and Surveillance System S2602; EOD Swimmer Subsystem (U)", Final Report Secret Supplement (January 1966 - August 1966) (AD 377 422 L), from Department of the Navy, Commander, Operational Test and Evaluation Force, Norfolk, Virginia, for Department of the Navy, Chief of Naval Operations, Washington, D. C. (November 14, 1966), 11 pp (SECRET/NOFORN) (PA 30,338).

(U) "The EOD Swimmer Subsystem of the Mine Hunting and Surveillance System S2602 was developed to provide the mine forces with a means of mine location and neutralization when guided, self-powered neutralizers are effective or considered inappropriate. Equipment tested during the evaluation consisted of the following: the ZEEBIRD swimmer support craft, a 16-foot inflatable raft constructed of neoprene coated nylon; 18- and 20-horsepower Johnson outboard motors, modified with an air exhaust vent to suppress motor noise; small polyethylene Swimmer Marker Buoys; and the Mk 16 Mod 0 Sonar Receiver, a battery operated hand-held device for detecting underwater acoustic signals."

CONFIDENTIAL

CONFIDENTIAL

- (IV-55) "U. S. Navy Research and Development Unit First Semi-Annual Progress Report (U)", from Department of the Navy, Navy Research and Development Unit, Vietnam, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (July 1, 1967), 39 pp (SECRET) (PA 30,381).

(For annotation, see I-50.)

- (IV-56) Caudle, Kenneth F., Goertner, Jean A., and Holland, Norma O., "Explosives - Effects and Properties (U)", Report No. NOLTR-65-218 (AD 381 347), from Department of the Navy, Naval Ordnance Laboratory, Explosions Research Department, Silver Spring, Maryland (February 21, 1967), 107 pp (CONFIDENTIAL) (PA 30,800).

(U) "The charts and graphs contained herein display the properties of explosive materials and show the effects of their explosion in air, underwater, and on metals. Each section is self-explanatory and is designed for convenient use by explosives experts. In many cases, the data are given in a nomograph which allows effects predictions from the geometry, weight, and composition of the explosives."

- (IV-57) Trantham, Hershel W., "Feasibility Tests for High-Speed Magnetic Detection of Viet Cong River Mines (U)", Report No. i-135 (AD 383 864), from Department of the Navy, Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Commander, Naval Ship Engineering Center, Washington, D. C. (September 1967), 13 pp (CONFIDENTIAL) (PA 30,962).

(C) "The British-made multiple towed gradiometer (MTG) and MDL-fabricated mine models were used in tests to demonstrate the feasibility of high-speed magnetic detection of Viet Cong river mines. The mine models were detected at lateral ranges as great as 15 feet at boat speeds up to 25 knots. These results are considered to warrant the recommendation of additional development of magnetic detection systems..."

- (IV-58) "Operational Evaluation Mine Defense Laboratory Mine Countermeasures Drone Hydrodyne Boat (U)", Final Report No. 9-67, from U. S. Navy Research and Development Unit, Vietnam, APO, San Francisco, California 96214 (October 7, 1967), 158 pp (CONFIDENTIAL) (PA 31,291).

(C) "The Navy Research and Development Unit, Vietnam, evaluated the performance of four drones which were integrated with existing MINRON 11 Det "A" resources and employed in operational sweeps of the Long Tau River, the main shipping channel from the sea to Saigon. The Hydrodyne drone is a fiberglass hull boat powered by a V-8 marine engine and designed to tow the straight chain drag at speeds up to 15 knots...Control is effected by tone modulation of a UHF carrier. Different tones correspond to different commands (turn, speed, etc.). Data was obtained on system performance, tactics, training, supply and maintenance effort required."

IV-13

CONFIDENTIAL

CONFIDENTIAL

- (IV-59) Bauman, George E., "The Two-Boat Catenary Chain Bottom Drag (U)", Interim Report No. i-127 (AD 382 731 L), from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Commander, Naval Ship Systems Command, Washington, D. C. (July 1967), 29 pp (CONFIDENTIAL) (PA 31,949).

(C) "A two-boat catenary chain bottom drag was evaluated at 4, 6, and 8 knots with boat separations of 200, 300, and 400 feet, usually in 60 feet of water. The drag was tested against simulated moored mines planted on hard, smooth sand, hard rippled sand, and mud. The drag's effectiveness in breaking the mooring or dragging a simulated mine was poor, and it is not recommended for general clearing sweeping of rivers and canals but should be retained for possible use as a special sweep when the approximate location of a river mine is known..."

- (IV-60) McGraw, C. T., and Higgins, F. J., "Mine Control Wire Detector (U)", Final Report No. 342 (AD 385 024), from U. S. Navy Mine Defense Laboratory, Panama City, Florida (October 1967), 19 pp (CONFIDENTIAL) (PA 32,191).

(C) This report describes a method of detecting, by galvanic means, a signal generated when a copper mine-command wire is severed by a steel cutter.

- (IV-61) "History of Naval Operations Vietnam: 1946 - 1963 (U)", from U. S. Navy, Office Chief of Naval Operations, Naval History Division, Washington, D. C. (June 1964), 247 pp (SECRET) (PA 19,770).

(For annotation, see I-64.)

- (IV-62) "VA-3 Air Cushion Vehicle Operational Tests at Norfolk, Virginia", Final Report No. RAC-2954 (AD 808 862 L), from Republic Aviation Corporation, Farmingdale, Long Island, New York, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. NObs-4848 (May 19, 1965), 29 pp (UNCLASSIFIED) (PA 29,721).

(U) "The test program for the vehicles was designed to be a test of the concept rather than the potential of the vehicles assigned to the project. The tests covered the following possible applications: amphibious, anti-submarine, unconventional, and mine warfare and search and rescue operations. A training program for assault boat coxswains and engineers was also conducted to determine the type, training, experience, and quantity of personnel required to operate and maintain ACV's. The test program has been satisfactorily concluded and the VA-3 test results are reported herein..."

CONFIDENTIAL

CONFIDENTIAL

- (IV-63) Meacham, J. A., "The Mine Countermeasures Ship", U. S. Naval Institute Proceedings, Vol 94 (4), pp 128-129 (April 1968) (UNCLASSIFIED) (PA 32,297).

(For annotation, see V-51.)

- (IV-64) Cooper, A. T., "Mine Classification Capabilities of the Mark 2 Ordnance Locator (U)", Report No. 134 (AD 312 408 L), from U. S. Navy, U. S. Navy Mine Defense Laboratory, Panama City, Florida (May 1958), 28 pp (CONFIDENTIAL) (PA 32,578).

(C) "Tests were performed to determine experimentally the mine classification capabilities of a Mark 2 Ordnance Locator. Statistically designed tests were made in the non-ferrous area of the Laboratory. Test design included nine targets, three orientations of targets, and six distances of the targets from the detector carriage track. The tests were made at a speed of two knots. Target signatures were analyzed to determine the mine classification capabilities of a single detector, and no promise of mine classification by a single Mark 2 Ordnance Locator was found. It is believed that classification can be performed with detectors used in multiple. Further tests to verify the feasibility of classification with Mark 2 Ordnance Locators used in multiple are recommended. If proven feasible, development of a suitable analyzer and display system should be undertaken."

- (IV-65) "A Study of Mine and Mine Countermeasures Operations in Guerrilla Warfare: Project PEBBLE (U)", Final Report No. NRC:MAC:2019, Volume II, from National Academy of Sciences, National Research Council Mine Advisory Committee, Washington, D. C., for Office of Naval Research, Washington, D. C., and Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. 2300(10) (March 1968), 501 pp (SECRET/NOFORN) (PA 32,728).

(For annotation, see I-73.)

IV-15 and IV-16

CONFIDENTIAL

SECRET

SECTION V

INSHORE OPERATIONS (U)

SECRET

UNCLASSIFIED

SECTION V

INSHORE OPERATIONS (U)

As stated in the Introduction, the series "Harbor Defense and Counter-measures Bulletin(s)", issued by the Office of Naval Research, has been omitted from this bibliography.

- (V-1) Wise, W. P., "The Vulnerability of Landing Craft to Small Ground Mines (U)", Report No. UERD-2-59 (AD 308 982), from Norfolk Naval Shipyard, Underwater Explosions Research Division, Portsmouth, Virginia, for Department of the Navy, Washington, D. C. (April 1959), 98 pp (CONFIDENTIAL) (PA 5206).

(For annotation, see I-2.)

- (V-2) Dosien, R. W., and Thornton, R. M., "Firepower Requirements for Remote Area Combat Logistical Capability in Remote Area Combat. Volume IV: Logistics Capability in Remote Area Combat (U)", Final Report (AD 351 513), from Applied Science Corporation, Santa Paula, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. OS-SD-128, ARPA Order No. 324 (March 1963) (SECRET) (PA 5287).

(For annotation, see I-3.)

- (V-3) "Analysis of Geographic and Climatic Factors in Coastal Southeast Asia", Final Report No. 04231-1-F (AD 275 476), from The University of Michigan, College of Literature, Science, and the Arts, Department of Geography, Ann Arbor, Michigan, for Quartermaster Research and Development Command, Environmental Protection Research Division, Natick, Massachusetts, Contract No. DA-19-129-QM-1655 (March 1962) (UNCLASSIFIED) (PA 8530).

(For annotation, see I-9.)

- (V-4) Drachnick, J. B., "Concept for a U. S. River Warfare Force (U)", from Military Assistance Advisory Group-Vietnam, Navy Section, Saigon, Vietnam (August 17, 1962) (CONFIDENTIAL) (PA 18,800).

(For annotation, see I-16.)

- (V-5) Brinton, G., Clare, K., and Dow, I., "Analysis of Naval Involvement in Counterinsurgency Operations (U)", Final Report, Stanford Research Institute, Southern California Laboratories, South Pasadena, California (April 1965), 78 pp (SECRET) (PA 20,215).

(For annotation, see I-18.)

UNCLASSIFIED

- (V-6) Bucklew, P. H., "Report of Recommendations Pertaining to Infiltration Into South Vietnam of Viet Cong Personnel, Supporting Materials, Weapons and Ammunition (U)", from U. S. Military Assistance Command-Vietnam, APO 143, San Francisco, California (February 15, 1964) (SECRET) (PA 20,412).

(For annotation, see I-19.)

- (V-7) "Project PEBBLE. A Study of Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume I: Assumptions, Conclusions and Recommendations (U)", from National Academy of Sciences, National Research Council, Mine Advisory Committee, Washington, D. C. (November 1965) (SECRET/NOFORN) (PA 21,378).

(For annotation, see I-20.)

- (V-8) "Project PEBBLE. Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume III: Bibliography (U)", Final Report No. NRC:MAC:2019 (AD 371 950 L), from National Academy of Sciences, National Research Council, Mine Advisory Committee, Project PEBBLE Study Group, Washington, D. C. (March 1966) (CONFIDENTIAL) (PA 22,032).

(For annotation, see I-21.)

- (V-9) Brumbaugh, D. A., Kirkland, J. T., and Muller, J. A., "Analysis of Threat in Inshore Undersea Warfare (U)", Report No. 259 (AD 359 248 L), from Operations Research, Inc., Silver Spring, Maryland, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. NObsr-89164 (January 20, 1964), 84 pp (SECRET) (PA 23,791).

(For annotation, see I-25.)

- (V-10) Waddey, R. F., and Brumbaugh, D. A., "Analysis of Detection and Surveillance Parameters for Inshore Undersea Warfare (U)", Report No. 257 (AD 359 247 L), from Operations Research, Inc., Silver Spring, Maryland, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. NObsr-89164 (January 20, 1964) (SECRET) (PA 24,066).

(U) "This report analyzes the potential performance of conceivable detection systems for IUW application. Detection is the most important single function of a defensive system, since other functions rely on it to indicate the presence and, at least the approximate, location of a potential threat. The analysis indicates the most promising ranges of detection parameters and provides guidance for the development of practical detection systems."

- (V-11) Ramsay, B. P., "The Proceedings of the Second Technical Conference on the Naval Minefield: Environmental Effects (U)" (January 26-27, 1959), Report No. NAVORD-6200, from U. S. Naval Ordnance Laboratory, White Oak, Maryland (March 31, 1959) (SECRET) (PA 24,307).

(For annotation, see IV-31.)

UNCLASSIFIED

UNCLASSIFIED

- (V-12) Ramsay, B. P., "Proceedings of the Sixth Conference on the Naval Minefield. Volume II: The Supplement - Small Mines (U)" (January 28-29, 1963), Report No. NOLTR-63-63, from U. S. Naval Ordnance Laboratory, White Oak, Maryland (June 14, 1963) (SECRET) (PA 24,308).

(For annotation, see IV-32.)

- (V-13) Ramsay, B. P., "Proceedings of the Seventh Conference of the Naval Minefield: Its Objectives. Volume I: The Session (January 27-28, 1964) (U)", Report No. NOLTR-64-64, from U. S. Naval Ordnance Laboratory, White Oak, Maryland (March 31, 1964) (SECRET) (PA 24,309).

(For annotation, see IV-32.)

- (V-14) Ramsay, B. P., "Proceedings of the Sixth Conference on the Naval Minefield: Small Mines, Volume I: The Sessions (U)" (January 28-29, 1963), Report No. NOLTR-63-63, from U. S. Naval Ordnance Laboratory, White Oak, Maryland (March 29, 1963) (SECRET) (PA 24,310).

(For annotation, see IV-32.)

- (V-15) "Beach Minefield Clearance in Amphibious Operations (U)", Final Report No. MOOR-02-7 (AD 16 986), from American Power Jet Company, Marine Office of Operations Research, Ridgefield, New Jersey (March 1953), 156 pp (CONFIDENTIAL) (PA 24,369).

(For annotation, see IV-35.)

- (V-16) Bontadelli, J. A., Nielsen, K. L., and Virgin, W. P., "Swamp Forest Warfare (U)", Report No. BAT-171-45 (AD 376 328 L), from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-171 (May 16, 1966), 150 pp (SECRET) (PA 24,510).

(For annotation, see I-28.)

- (V-17) Bontadelli, J. A., Nielsen, K. L., and Virgin, W. P., "Swamp Forest Warfare: Summary (U)", Report No. BAT-171-45-1 (AD 376 327 L), from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-171 (May 16, 1966), 22 pp (SECRET) (PA 24,511).

(For annotation, see II-29.)

- (V-18) "Investigate the Usefulness of Air Cushion Ships in Naval Missions (U)", Final Report (AD 368 946 L), from Commander, Operational Test and Evaluation Force, Norfolk, Virginia, for Department of the Navy, Bureau of Ships, Washington, D. C. (January 3, 1966), 82 pp (CONFIDENTIAL) (PA 24,897).

(For annotation, see I-30.)

UNCLASSIFIED

- (V-19) "Lessons Learned No. 50: Naval Conduct of Amphibious Operations (U)", from Commander, U. S. Military Assistance Command, Vietnam (J3), APO, San Francisco, California 96243 (April 13, 1965), 7 pp (CONFIDENTIAL/MODIFIED HANDLING AUTHORIZED) (PA 24,992).

(For annotation, see I-32.)

- (V-20) "A Handbook of U. S. Naval Systems and Operations (U)", Report No. ONR-ACR-NAR-30, from Department of the Navy, Office of Naval Research, Naval Analysis Group, Washington, D. C. (June 1965) (SECRET/NOFORN) (PA 25,120).

(For annotation, see I-33.)

- (V-21) Burt, H. R., Eby, C. L., and Gollobin, L. P., "Appraisal of Explosive Line Charges for Mine Clearance (U)", Report No. 113 (AD 378 340 L), from Presearch, Inc., Silver Spring, Maryland, for U. S. Naval Air Systems Command, Mine Warfare Projects, Washington, D. C., Contract No. NOW-65-0654-C (June 30, 1966) (SECRET/NOFORN) (PA 27,347).

(U) "This report summarizes the results of a theoretical research study of the NOTS 301D line charge as it might be employed to neutralize naval mines...Particular emphasis is placed on estimating the feasibility, usefulness, and value of line charge for mine clearance in support of amphibious operations, especially in the shallow beach approaches. Potential tactical situations are described, together with means for countering naval mines, including explosives, mine-sweeping, minehunting, and swimmer-placed charges. Alternative methods and systems for placing line charge are developed and their relative performance assessed."

- (V-22) Nerenstone, M. A., and Culbertson, D. D., "Market Time: Countering Sea-Borne Infiltration in South Viet Nam (U)", Report No. OEG 706 (AD 378 336 L), from The Franklin Institute, Center for Naval Analyses, Operations Evaluation Group, Washington, D. C., for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. NONr-3732(00) (December 20, 1966), 100 pp (SECRET) (PA 27,451).

(U) "This study presents data and...analyses relevant to Market Time operations as of early Spring 1966, and describes the infiltration threat, the forces involved, and their method of operation. Estimates of the Viet Cong infiltration rate and their significance are discussed. Barrier design and effectiveness estimates, when a few infiltrators must be distinguished from many innocent ships, are considered."

- (V-23) "Shallow-Water Naval Warfare-Analysis of Threats and Capabilities (U)", Report No. NRC-MAC-2025 (AD 378 140 L), from National Academy of Sciences, National Research Council, Mine Advisory Committee, Washington, D. C., for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-2300(10) (November 1966), 102 pp (SECRET/NOFORN) (PA 27,453).

V-4

UNCLASSIFIED

SECRET

(This page is Unclassified)

(V-23) (Cont'd) (For annotation, see I-38.)

(V-24) Nelson, Andrew G., and Mosher, Norman G., "Proposed: A Counterinsurgency Task Force", U. S. Naval Institute Proceedings, pp 36-45 (June 1966) (UNCLASSIFIED) (PA 27,695).

(For annotation, see I-40.)

(V-25) Harrigan, Anthony, "Inshore and River Warfare", Orbis, Vol 10 (3), pp 940-946 (Fall 1966) (UNCLASSIFIED) (PA 27,701).

(For annotation, see I-41.)

(V-26) Harllee, J., "Patrol Guerrilla Motor Boats", U. S. Naval Institute Proceedings, Vol 90 (4), pp 70-90 (April 1964) (UNCLASSIFIED) (PA 27,864).

(For annotation, see I-42.)

(V-27) Endacott, Jack A., "Waterbased Counterinsurgency", a Thesis presented at the Naval War College, Newport, Rhode Island (March 2, 1964), 42 pp (UNCLASSIFIED) (PA 28,659).

(For annotation, see I-44.)

(V-28) La Violette, Paul E., and Frontenac, Theodore R., "Temperature, Salinity, and Density of the World's Seas: South China Sea and Adjacent Gulfs", Report No. IM-67-5, from U. S. Naval Oceanographic Office, Washington, D. C. (February 1967), 141 pp (UNCLASSIFIED) (PA 28,729).

(U) "...This is the first in a series of reports which will describe the temperature, salinity, and density distributions of various seas of the world."

(V-29) "Feasibility of Developing and Employing Polyurethane Foam as a Line of Communication Interdiction System", from Battelle Memorial Institute, RACIC, Columbus, Ohio (August 1967), 23 pp (UNCLASSIFIED) (PA 29,343).

(For annotation, see I-47.)

(V-30) "Evaluate the AN/SQS-19 Mine Detecting Set (U)", Final Report (AD 368 827 L), from Department of the Navy, U. S. Naval Operational Test and Evaluation Force, Norfolk, Virginia, for Chief of Naval Operations, Washington, D. C. (June 24, 1960), 49 pp (CONFIDENTIAL) (PA 30,156).

(For annotation, see IV-52.)

(V-31) Blue Book of Coastal Vessels - Thailand, from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., Contract Nos. SD-171 and F-33657-67-C-0810 (1967), 430 pp (UNCLASSIFIED) (PA 30,194).

(For annotation, see VI-3. See also VI-4, VI-5, and VI-6.)

SECRET

- (V-32) Dow, Irving, and Brinton, George, "South Vietnam Coastal Patrol: A Study of Inshore Coastal Patrol Operations in Counterinsurgency Warfare (U)", Draft Report, from Westwood Research, Inc., Los Angeles, California, for Office of Naval Research, Washington, D. C., Contract No. Nonr-4962(00) (January 1967), 86 pp (SECRET) (PA 30,891).

(S) "The overall objective of this study has been to provide an analytical appreciation of the inshore coastal patrol problem and a basis for selecting craft and formulating the structure of an inshore coastal patrol force for counterinsurgency warfare. South Vietnam has been treated as the basic problem area. Briefly, the method of approach has been as follows. First, the potential need for an inshore coastal patrol was examined relative to the geographical situation and to the nature of the insurgent threat and the various insurgent activities bearing on the specific requirements for an inshore coastal patrol. Attention was then given to the formulation of a number of specific inshore patrol missions that would be of direct significance in the overall counterinsurgency effort. The ensuing step was to specify the general concept of employment and the operational functions or tasks that would enable the inshore coastal patrol to accomplish these specific missions. Next, the types of patrol craft and other resources and support essential to the operations of an inshore coastal patrol force were specified and, finally, certain critical relationships were established among numbers and speed of craft, levels of detection and intercept capability desired, and different concepts of employment or maneuver of the patrol craft within an inshore coastal patrol zone..."

- (V-33) Searle, W. F., Jr., "The Case for Inshore Warfare", The Naval Review 1966, pp 3-23 (1966) (UNCLASSIFIED) (PA 30,917).

(For annotation, see I-51.)

- (V-34) Outlaw, James F., Thomas, Marlin A., and Goswick, Thomas E., "The Effectiveness of Naval Gunfire Against Selected Targets in the Landing Force Support Study (U)", Report No. K-43/67 (AD 383 721), from U. S. Naval Weapons Laboratory, Computation and Analysis Laboratory, San Diego, California (August 1967), 81 pp (SECRET) (PA 30,974).

(S) "...the U. S. Naval Weapons Laboratory, Dahlgren, Virginia, conducted various parameter studies concerning the effectiveness of naval gunfire. This memorandum presents the methodology employed in these studies as well as a portion of the study results in the form of round requirements for incapacitating a variety of targets with the 5"/38, 5"/54, 6"/47, 175mm (proposed), and 8"/55 naval guns using both conventional and brittle steel warheads at range increments of 5000 yards. Also included are the lethal areas and dispersion data used to compute the round requirements."

V-6

SECRET

CONFIDENTIAL

(This page is Unclassified)

- (V-35) Unmacht, George F., "Chemical Mortar Boats in the Pacific Ocean Areas", Military Review, Vol 26 (8), pp 15-19 (November 1946) (UNCLASSIFIED) (PA 31,156).

(U) "One of the most unusual uses of Army weapons during the war was the use of the Army's 4.2-inch chemical mortar as Naval support weapon, for use in landing operations. During the assault of landing beaches, there came a time when it was necessary to lift the fire of the naval guns, and support planes could no longer drop their bombs for fear of injuring friendly troops as they arrived at the landing beaches. Considerable time was required before the artillery could move field pieces onto the beach and start firing at land targets, continuing where the naval guns were forced to leave off. The use of ship-mounted 4.2-inch chemical mortars helped to fill this gap with gunfire that was both accurate and devastating."

- (V-36) "U. S. Navy Symposium on Military Oceanography. The Proceedings of the Symposium. Volume I (11-13 May 1966) (U)" (AD 376 894), from U. S. Navy Electronics Laboratory, San Diego, California (1966), 398 pp (CONFIDENTIAL) (PA 31,341).

(For annotation, see IX-27.)

- (V-37) Mairs, Robert, and Bright, Chester, "Potential Uses of a Swimmer Operated Craft in Oceanography and Riverine Warfare (U)", Report No. IR-67-58 (AD 383 730 L), from U. S. Naval Oceanographic Office, Research and Development Department, Coastal Oceanography Branch, Washington, D. C. (August 1967), 13 pp (SECRET) (PA 31,552).

(For annotation, see I-55.)

- (V-38) Westerman, Arthur B., Costello, John C., Jr., and Chaffee, Clarence C., "Green Book of Coastal Vessels - Thailand" (AD 824 364), from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., and Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, Contract Nos. SD-171, and F-33657-67-C-0810 (1967), 231 pp (UNCLASSIFIED) (PA 31,791).

This is an abbreviated version of V-31. See also VI-4, VI-5, and VI-6.

- (V-39) Westerman, Arthur B., Costello, John C., Jr., and Freudenreich, Leo B., "Green Book of Coastal Vessels - South Vietnam", from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, and Republic of Vietnam Armed Forces, The Combat Development and Test Center, Contract Nos. SD-171, and F-33657-67-C-0810 (1967), 323 pp (UNCLASSIFIED) (PA 31,792).

This is an abbreviated version of V-40. (For annotation, see VI-6.)

V-7

CONFIDENTIAL

CONFIDENTIAL

- (V-40) Westerman, Arthur B., Costello, John C., Jr., and Freudenreich, Leo B., "Blue Book of Coastal Vessels - South Vietnam", from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, R&D Field Unit-Thailand, Bangkok, Thailand, Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, and Republic of Vietnam Armed Forces, The Combat Development and Test Center, Contract Nos. SD-171, and F-33657-67-C-0810 (1967), 556 pp (UNCLASSIFIED) (PA 31,793).

(For annotation, see VI-6.)

- (V-41) Berryman, John L., Jr., and Haulman, C. Austin, "Characteristics of Key Ports of South Vietnam and Analysis of Specific Ship Defense Problems (U)", Report No. 336 (AD 385 209 L), from U. S. Navy Mine Defense Laboratories, Panama City, Florida (August 1967), 138 pp (SECRET/NOFORN) (PA 31,954).

(For annotation, see VIII-23.)

- (V-42) Good, R. P., "The Bamboo Navy - South Vietnam's Junk Force (U)", a Thesis presented at the Naval War College, Command and Staff Course, Newport, Rhode Island (1965), 71 pp (SECRET/NOFORN) (PA 32,223).

(U) This thesis may not be quoted or extracted.

- (V-43) "Report of the Advisory Board Concerning the An Xuyen Quarantine Operation (U)", from Office of the Secretary of Defense, Advanced Research Projects Agency, R&D Field Unit-Vietnam, APO, San Francisco, California 96243 (December 31, 1964), 19 pp (CONFIDENTIAL) (PA 32,287).

(C) This report discusses the reasons for the failure of the VNN to seal off An Xuyen Province from waterborne infiltration and recommends corrective action.

- (V-44) Corriher, H. A., Jr., et al., "Radar Reflectivity of Sea Targets", Final Report, Volume I, from George Institute of Technology, Engineering Experiment Station, Atlanta, Georgia, for Department of the Navy, Office of Naval Research, Air Programs Branch, Washington, D. C., Contract No. Nonr-991(12) (September 30, 1967), 114 pp (UNCLASSIFIED) (PA 32,316).

(For annotation, see I-63.)

- (V-45) "History of Naval Operations Vietnam: 1946 - 1963 (U)", from U. S. Navy, Office Chief of Naval Operations, Naval History Division, Washington, D. C. (June 1964), 247 pp (SECRET) (PA 19,770).

(For annotation, see I-64.)

UNCLASSIFIED

- (V-46) Pifer, Barry G., "Full-Scale Seaworthiness Tests of a 52-Foot Landing Craft Swimmer Reconnaissance (LCSR) (U)", Final Report No. C-2093 (AD 369 316), from U. S. Navy, David Taylor Model Basin, Hydromechanics Laboratory, Washington, D. C., for Department of the Navy, Bureau of Ships, Washington, D. C. (January 1966), 23 pp (CONFIDENTIAL) (PA 22,603).

(For annotation, see VII-58.)

- (V-47) Harvel, K. W., and Stokes, R. H., "A Summary of Hydrographic Data for Acoustic Mine Hunting in Several Foreign Harbors (U)", Report No. DRL-A-165, from The University of Texas, Defense Research Laboratory, Austin, Texas, for Department of the Navy, Office of Naval Research, Bureau of Ships, Washington, D. C., Contract No. NObsr-72627 (December 18, 1959), 24 pp (CONFIDENTIAL) (PA 24,837).

(For annotation, see III-32.)

- (V-48) Muller, J. A., Cornell, M. E., and Brumbaugh, D. A., "Analysis of Attack Weapon Systems for Inshore Undersea Warfare (U)", Report No. 258 (AD 359 103 L), from Operations Research Inc., Silver Spring, Maryland, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. NObsr-89164 (January 20, 1964), 54 pp (CONFIDENTIAL) (PA 25,643).

(For annotation, see I-65.)

- (V-49) Beebe, Robert P., "Operations in Restricted Waters", U. S. Naval Institute Proceedings, pp 23-33 (June 1962) (UNCLASSIFIED) (PA 27,968).

(For annotation, see I-66.)

- (V-50) Logan, Robert S., Webber, Wendell E., and Wilens, Martin B., "Vietnam Evaluation Personnel Air Cushion Vehicle (PACV) (U)", Final Report (AD 379 188), from U. S. Navy Research and Development Unit, APO, Vietnam, for Department of the Navy, Chief of Naval Operations (OP-345), Washington, D. C. (January 29, 1966), 167 pp (CONFIDENTIAL) (PA 28,673).

(For annotation, see I-68.)

- (V-51) Meacham, J. A., "The Mine Countermeasures Ship", U. S. Naval Institute Proceedings, Vol 94 (4), pp 128-129 (April 1968) (UNCLASSIFIED) (PA 32,297).

(U) "The USS Ozark (MCS-2)...represents a new concept in mine countermeasures ships...The result of Navy thinking in the late 1950's was the Ozark class, consisting of the Ozark and the USS Catskill (MCS-1), commissioned 6 October 1967. In physical characteristics, the Ozark, a converted landing vehicle ship (LSV), is 453 feet long overall, 60 feet in beam, 9,300 tons displacement, 20 feet in draft, and has a crew of 421 enlisted men and 25 officers. The Ozark is armed with 20 36-foot minesweeping launches and two RH-3A mine-sweeping helicopters that can carry two men. Thus, she is not really a support ship but a weapons system projector..."

V-9

UNCLASSIFIED

UNCLASSIFIED

- (V-52) Boyle, John M., and Baker, Eugene B., "Project SWAB (Shallow-Water Attack Boat) (U)", Report No. NWC-TP-4495, from U. S. Naval Ordnance Test Station, Aviation Ordnance Department, China Lake, California (December 1967), 44 pp (CONFIDENTIAL) (PA 32,599).

(For annotation, see VII-84.)

- (V-53) "A Study of Mine and Mine Countermeasures Operations in Guerrilla Warfare: Project PEBBLE (U)", Final Report No. NRC:MAC:2019, Volume II, from National Academy of Sciences, National Research Council Mine Advisory Committee, Washington, D. C., for Office of Naval Research, Washington, D. C., and Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. 2300(10) (March 1968), 501 pp (SECRET/NOFORN) (PA 32,728).

(For annotation, see I-73.)

- (V-54) Willoughby, Malcom F., Rum War at Sea, Government Printing Office, Washington, D. C. (1964) (UNCLASSIFIED).

(For annotation, see II-9.)

- (V-55) "Naval Review - 1968", edited by Frank Uhlig, Jr., U. S. Naval Institute, Annapolis, Maryland (1968) (UNCLASSIFIED) (PA 33,727).

(For annotation, see I-75.)

- (V-56) Singer, Floyd L., "First Interim Report on Shallow-Water Antisubmarine Warfare. Volume 4. Environmental Data on Selected Shallow-Water Areas (U)", Report Nos. NAVWEPS-8786, and NOTS-TP-3877 (AD 371 328 L), from U. S. Naval Ordnance Test Station, Weapons Planning Group, China Lake, California, for Department of the Navy, Bureau of Weapons, Washington, D. C. (December 1965), 278 pp (CONFIDENTIAL/NOFORN) (PA 28,195).

(U) A compilation of existing environmental data for selected shallow-water areas (100 fathoms deep or less) is given as Volume 4 of a seven-volume study of shallow-water antisubmarine warfare. Discussion, illustrated by 185 maps, covers 11 environmental factors such as bathymetry, bottom sediments, temperature, salinity, winds and currents, sea state, visibility, and ice conditions for six areas: Southeast Asia; East Asia; Bering Strait and Bering, Chukchi, and East Siberian Seas; Hudson Bay and approaches; Northwest Passage; and Northern Europe.

- (V-57) Cracknell, LCDR William H., Jr., "The Role of the U. S. Navy in Inshore Waters", Naval War College Review, Vol 21 (3), pp 65-91 (November 1968) (UNCLASSIFIED).

(For annotation, see I-76.)

UNCLASSIFIED

- (V-58) "Naval and Maritime Requirements for Area Security: A Study of the Naval Requirements for Coping With the Threat of Sublimated War in the Maritime Regions of the Underdeveloped World (U)" (AD 439 180), from Atlantic Research Corporation, Georgetown Research Project, Alexandria, Virginia, for Naval Research Laboratory, Naval Analysis Activity, Washington, D. C., Contract No. N00014-66-C0261 (August 1967), 333 pp (SECRET/NOFORN) (PA 32,940).

(For annotation, see I-77.)

- (V-59) "Use of SWIFT Type Boats in the Vietnam Coastal Patrol (U)", from Military Assistance Command, Naval Advisory Group, Saigon, Vietnam (April 1, 1965), 14 pp (CONFIDENTIAL) (PA 32,288).

(For annotation, see VII-16.)

V-11 and V-12

UNCLASSIFIED

CONFIDENTIAL

SECTION VI

JUNKS AND SAMPANS (U)

CONFIDENTIAL

UNCLASSIFIED

SECTION VI

JUNKS AND SAMPANS (U)

- (VI-1) Dosien, R. W., and Thornton, R. M., "Firepower Requirements for Remote Area Combat Logistical Capability in Remote Area Combat. Volume IV: Logistics Capability in Remote Area Combat (U)", Final Report (AD 351 513), from Applied Science Corporation, Santa Paula, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. OSD-SD-128, ARPA Order No. 324 (March 1963) (SECRET) (PA 5287).

(For annotation, see I-3.)

- (VI-2) Gould, A. S., Jr., and Foster, G. J., "Junks - Construction and Regional Characteristics (U)", Report No. NOTS-3808 (AD 463 434 L), from U. S. Naval Ordnance Test Station, Weapons Development Department, China Lake, California, for Department of the Navy, Bureau of Naval Weapons, Washington, D. C. (March 1965) (UNCLASSIFIED) (PA 18,839).

(U) This report describes the characteristics of the junks of China. Junks of other countries are not included.

- (VI-3) Blue Book of Coastal Vessels - Thailand (AD 823 213), from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., Contract Nos. SD-171, and F-33657-67-C-0810 (1967), 430 pp (UNCLASSIFIED) (PA 30,194).

(U) "The major objectives of the Blue Book are...to provide a compilation of the major operating characteristics of the wooden-hulled coastal vessels of Thailand and to provide a basis for recognition and identification. The book defines the nature of normal maritime activity in Thai waters and will therefore assist officials in detecting possibly hostile coastal vessels operating outside the normal pattern. It will be useful for the education and training of patrol personnel. It should be viewed as a background and reference book as well as a recognition and identification manual. Thai and U. S. personnel assigned to new duties in Thai waters will find the book useful in introducing them quickly to the types of wooden-hulled vessels they will encounter. It is in the training and education areas that this book may make its greatest contribution."

(U) See also VI-4, VI-5, and VI-6.

UNCLASSIFIED

- (VI-4) Westerman, Arthur B., Costello, John C., Jr., and Chaffee, Clarence C., "Green Book of Coastal Vessels - Thailand" (AD 824 364), from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., and Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, Contract Nos. SD-171, and F-33657-67-C-0810 (1967), 231 pp (UNCLASSIFIED) (PA 31,791).

(U) This volume is an abbreviated version of VI-3.

- (VI-5) Westerman, Arthur B., Costello, John C., Jr., and Freudenreich, Leo B., "Green Book of Coastal Vessels - South Vietnam" (AD 827 291), from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, and Republic of Vietnam Armed Forces, The Combat Development and Test Center, Contract Nos. SD-171, and F-33657-67-C-0810 (1967), 323 pp (UNCLASSIFIED) (PA 31,792).

(U) This is an abbreviated version of VI-6.

- (VI-6) Westerman, Arthur B., Costello, John C., Jr., and Freudenreich, Leo B., "Blue Book of Coastal Vessels - South Vietnam", from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, R&D Field Unit-Thailand, Bangkok, Thailand, Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, and Republic of Vietnam Armed Forces, The Combat Development and Test Center, Contract No. SD-171, and F-33657-67-C-0810 (1967), 556 pp (UNCLASSIFIED) (PA 31,793).

(U) The major objectives of the Blue Book are to provide a compilation of the major operating characteristics of the wooden-hulled coastal vessels of the RVN and to provide a basis for recognition and identification. The book defines the nature of normal maritime activity in RVN waters and will therefore assist officials in detecting possibly hostile coastal vessels operating outside the normal pattern. It will be useful for the education and training of patrol personnel. It should be viewed as a background and reference book as well as a recognition and identification manual. RVNAF and U. S. personnel assigned to new duties in RVN waters will find the book useful in introducing them quickly to the types of wooden-hulled vessels they will encounter. It is in the training and education areas that this book may make its greatest contribution. See also VI-3, VI-4, and VI-5.

CONFIDENTIAL

- (VI-7) Good, R. P., "The Bamboo Navy - South Vietnam's Junk Force (U)", a Thesis presented at the Naval War College, Command and Staff Course, Newport, Rhode Island (1965), 71 pp (SECRET/NOFORN) (PA 32,223).

(U) This thesis may not be quoted or extracted.

- (VI-8) Hornell, J., "The Origin of the Junk and Sampan", The Mariner's Mirror, Vol 20 (3), pp 331-337 (July 1934) (UNCLASSIFIED) (PA 19,818).

(U) This article presents a general discussion of the origins of these craft, together with a description of the methods of construction.

- (VI-9) "An Analysis of the Chinese Communist Junk Fleet (C)", Report No. ONI-7-61, from Department of the Navy, Office of the Chief of Naval Operations, Office of Naval Intelligence, Washington, D. C., for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (Rec'd. June 13, 1966), 11 pp (SECRET) (PA 22,549).

(C) This study describes the various types and sizes of Chinese junks, their numbers, and approximate total capacity. The basic intent of the study was to determine the amphibious lift capacity of the junk fleet.

- (VI-10) Gould, Albert S., Jr., and Foster, Gerard J., "A Target Analysis and Weapons Selection (U)", Report Nos. NOTS-TP-3553, and NAVWEPS-8544, from U. S. Navy, U. S. Naval Ordnance Test Station, China Lake, California, for Department of the Navy, Bureau of Naval Weapons, Washington, D. C. (May 1964), 144 pp (SECRET/NOFORN) (PA 23,030).

(C) "In accordance with the request of the Bureau of Naval Weapons, an extensive study was made...to investigate the means of destroying...junks with conventional weapons launched from naval aircraft... The nature, employment, and analysis of junk targets are presented. The effectiveness of present in-service and newer programmed weapons against these targets is evaluated. No technical analysis of the junk exists in published form and it is hoped that this report may serve as a basis for future work relating to these craft..."

- (VI-11) Scott, David, "Report on Existing and Proposed Craft on the Mekong River", from Committee for Coordination of Investigations of the Lower Mekong Basin, Navigation Improvement Division, Bangkok, Thailand, for United Nations Economic Commission for Asia and the Far East, Bangkok, Thailand (March 15, 1967), 33 pp (UNCLASSIFIED) (PA 28,989).

(U) The original plan was "...to undertake investigations of existing river craft and appraise their design, efficiency, propulsion, materials, and equipment, and advise on the possibility of improvements or adaptations, and also study the design of modern river craft of

CONFIDENTIAL

CONFIDENTIAL

(This page is Unclassified)

- (VI-11) (Cont'd) (U) various types and establish specifications and cost estimates for the possible construction of such craft. Field trips were made to various parts of the river to examine existing craft, methods of building and operation in service, and also to assist in the selection of possible sites for the proposed new shipyards for Laos and Thailand."
- (VI-12) "Native Craft of Burma", Document No. 3989, from Thai National Documentation Center, Bangkok, Thailand (Rec'd. February 19, 1968), 4 pp (UNCLASSIFIED) (PA 31,639).
- (U) A group of silhouettes shows all the main types of Burmese craft, with a verbal description of each also given.
- (VI-13) Bucknell, Lt. Howard, "Notes on Some Junks and Sampans of the China Coast", Journal of the American Society of Naval Engineers, Inc., Vol 67 (2), pp 467-481 (May 1955) (UNCLASSIFIED) (PA 21,756).
- (U) The following are the headings of some of the sections of this article: The Construction of Junks, Hull Types, Junks and Their Crews, Junks and Their Uses, and Junks and Sampans of the Inland Waterways.
- (VI-14) Yuan, Stanley S. S., "Fishing Junks", Proceedings of the Engineering Society of Hong Kong, Volume 9, pp 41-78 (Session 1955-1956) (UNCLASSIFIED) (PA 21,632).
- (U) "This paper surveys briefly the diverse ways and means of fishing as developed by the fisherfolk off the coast of South China and Hong Kong. Following an examination of the traditional design of junks in the light of contemporary concepts of naval architecture, possible improvements in the efficiency and seaworthiness of these vessels as well as tentative solutions to certain problems arising from mechanization are suggested."
- (VI-15) Schoettler, Robert J., "The Motorization of Vietnamese Fishing Junks", Division of Agriculture, United States Operations Mission to Vietnam, Saigon, Vietnam (1960), pp 1-30 (UNCLASSIFIED) (PA 20,164).
- (U) This document gives, in good detail, information on construction of "basket-bottom" junks.

CONFIDENTIAL

SECRET/NOFORN

SECTION VII

SMALL CRAFT (WESTERN TYPES) (U)

SECRET/NOFORN

CONFIDENTIAL

SECTION VII

SMALL CRAFT (WESTERN TYPES) (U)

- (VII-1) "Boats of the United States Navy", Report No. NAVSHIPS-250-452, from Department of the Navy, Bureau of Ships, Boat and Small Craft Design Section, Hull Design Branch, Washington, D. C. (July 1960) (UNCLASSIFIED) (PA 1426).

(U) This catalog gives the "principal characteristics of most of the boats and craft presently in use in the Navy." It has plan and side views of all craft, as well as dimensions. Although dated 1960, the catalog describes many craft in use today.

- (VII-2) Wise, W. P., "The Vulnerability of Landing Craft to Small Ground Mines (U)", Report No. UERD-2-59 (AD 308 982), from Norfolk Naval Shipyard, Underwater Explosions Research Division, Portsmouth, Virginia, for Department of the Navy, Washington, D. C. (April 1959), 98 pp (CONFIDENTIAL) (PA 5206).

(For annotation, see I-2.)

- (VII-3) Dosien, R. W., and Thornton, R. M., "Firepower Requirements for Remote Area Combat Logistical Capability in Remote Area Combat. Volume IV: Logistics Capability in Remote Area Combat (U)", Final Report (AD 351 513), from Applied Science Corporation, Santa Paula, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. OSD-SD-128, ARPA Order No. 324 (March 1963) (SECRET) (PA 5287).

(For annotation, see I-3.)

- (VII-4) Lubnow, H. A., "Acoustical Surveillance System for Riverine Operations... (C)", from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Bureau of Ships, Washington, D. C. (September 4, 1964) (CONFIDENTIAL) (PA 9295).

(For annotation, see I-10.)

- (VII-5) "Development of Shallow-Draft Boats", Interim Report (AD 455 033 L), from University of Pittsburgh, Army Materiel Research Staff, Washington, D. C., for U. S. Army Materiel Command, Research and Development Directorate, Washington, D. C., Contract No. DA-40-186-AMC-214(D) (November 1964) (FOR OFFICIAL USE ONLY) (PA 15,588).

(U) Three boats were tested: the Mk II Swimmer Support Craft (the Dong Nai boat), the 16-foot Boston Whaler, and the Mk III Zodiac boat.

VII-1

CONFIDENTIAL

CONFIDENTIAL

- (VII-6) Brinton, George, Clare, Kenneth, and Dow, Irving, "Special Study of Mobility in the Mekong Delta Area of Vietnam (U)", Final Report (AD 360 436 L), from Stanford Research Institute, South Pasadena, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., and Office of Naval Research, Washington, D. C., Contract No. Nonr-4194(00), ARPA Order No. 574 (March 1965), 70 pp (SECRET) (PA 16,503).

(For annotation, see III-6.)

- (VII-7) Michels, Frederick H., "Underwater Acoustic Detection of Outboard Motors (U)", Interim Report No. NAVEODFAC 130 (October 28, 1964 - January 21, 1965) (AD 356 436 L), from U. S. Naval Explosive Ordnance Disposal Facility, Indian Head, Maryland, for Department of the Navy, Bureau of Naval Weapons, Washington, D. C. (January 21, 1965) (CONFIDENTIAL) (PA 17,532).

(For annotation, see I-13.)

- (VII-8) Byng, J. W., "Report on Types of Watercraft Best Suited for the Several Functions Incident to Guerrilla/Counter guerrilla Operations (U)", from Department of the Navy, Chief of Naval Operations, Washington, D. C., for Commander in Chief-Atlantic Fleet, and Commander in Chief-Pacific Fleet (May 15, 1962) (CONFIDENTIAL) (PA 18,801).

(C) The Chief of Naval Operations directed a panel to convene "for the purpose of determining the types of watercraft best suited for the several functions incident to guerrilla/counter guerrilla operations." Their report contains "an estimate of the requirements for watercraft for control of the rivers and contiguous land areas in guerrilla/counter guerrilla operations. As a basis for this study, three categories of performance requirements were derived with a broad statement of missions and tanks for each category. The conditions are far from being uniform. They vary from canals, ditches, swamps, etc., to narrow swiftly flowing rivers. Therefore, any 'family' of watercraft employed in guerrilla warfare should be capable of operations in the waterways of Southeast Asia or the river systems of China, Africa, or South America. These recommendations are based on this premise."

- (VII-9) Brinton, G., Clare, K., and Dow, I., "Analysis of Naval Involvement in Counterinsurgency Operations (U)", Final Report, Stanford Research Institute, Southern California Laboratories, South Pasadena, California (April 1965), 78 pp (SECRET) (PA 20,215).

(For annotation, see I-18.)

VII-2

CONFIDENTIAL

CONFIDENTIAL

(This page is For Official Use Only)

- (VII-10) Bhangsba, S., "Evaluation and Engineering Tests of the Westland SRN-5 Hovercraft in Thailand", Report No. 66-010 (AD 483 840), from Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (April 1966), 96 pp (FOR OFFICIAL USE ONLY) (PA 24,378).

(FOUO) "The Westland SRN-5 Hovercraft is a high speed, amphibious, air cushion vehicle (ACV). It is designed to carry passengers or cargo over swamps, rice paddies, and rough coastal waters. In December 1965, tests were conducted to evaluate the SRN-5's capabilities in various land and water environments found in Thailand. The tests demonstrated that the SRN-5 is capable of reaching areas that would be almost inaccessible to other types of land, sea or aircraft."

- (VII-11) "Investigate the Usefulness of Air Cushion Ships in Naval Missions (U)", Final Report (AD 368 946 L), from Commander, Operational Test and Evaluation Force, Norfolk, Virginia, for Department of the Navy, Bureau of Ships, Washington, D. C. (January 3, 1966), 82 pp (CONFIDENTIAL) (PA 24,897).

(For annotation, see I-30.)

- (VII-12) "Lessons Learned No. 47: River Assault Group Operations (U)", from Headquarters, U. S. Military Assistance Command, Vietnam, APO, San Francisco, California 96243 (March 30, 1965), 14 pp (CONFIDENTIAL/MODIFIED HANDLING AUTHORIZED) (PA 24,919).

(For annotation, see I-31.)

- (VII-13) Manny, P. A., and Clifford, N., "Summary of Experimental Information on Surface Ship Damage From Underwater Explosions. Part I (U)", Report No. C-1510 (AD 373 577), from Department of the Navy, David Taylor Model Basin, Washington, D. C. (October 1963), 405 pp (CONFIDENTIAL/FORMERLY RESTRICTED DATA) (PA 25,027).

(For annotation, see IV-39.)

- (VII-14) "Lessons Learned No. 50: Naval Conduct of Amphibious Operations (U)", from Commander, U. S. Military Assistance Command, Vietnam (J3), APO, San Francisco, California 96243 (April 13, 1965), 7 pp (CONFIDENTIAL/MODIFIED HANDLING AUTHORIZED) (PA 24,992).

(For annotation, see I-32.)

- (VII-15) Clifford, Norman, and Manny, Paul A., "Summary of Experimental Information on Surface Ship Damage From Underwater Explosions. Part II (U)", Report No. C-1511, from Department of the Navy, David Taylor Model Basin, Structural Mechanics Laboratory, Washington, D. C. (May 1963) (SECRET) (PA 26,236).

(For annotation, see IV-44.)

VII-3

CONFIDENTIAL

CONFIDENTIAL

- (VII-16) "Use of SWIFT-Type Boats in the Vietnam Coastal Patrol (U)", from Military Assistance Command, Naval Advisory Group, Saigon, Vietnam (April 1, 1965), 14 pp (CONFIDENTIAL) (PA 32,288).

(C) This reports on the "desirability, concept of use, and disposition of SWIFT in a Vietnamese coastal patrol mission".

- (VII-17) Hawkins, Jackson T., and Hirsch, Arthur E., "Protection for Minesweeper Personnel: The Shock-Attenuating Deck Pad (U)", Report No. C-2265 (AD 377 593), from Department of the Navy, David Taylor Model Basin, Structural Mechanics Laboratory, Washington, D. C., for Department of the Navy, Bureau of Ships, Washington, D. C. (October 1966), 25 pp (CONFIDENTIAL) (PA 26,690).

(For annotation, see IV-45.)

- (VII-18) Cheaney, E. S., Widder, R. I., and DeLong, M. M., "The Feasibility of Reducing Costs of Air Cushion Vehicle (ACV)", Report No. BAT-171-46, from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., Contract No. SD-171, ARPA Order No. 324 (May 15, 1966), 30 pp (FOR OFFICIAL USE ONLY) (PA 26,863).

(FOUO) "This inquiry was made in response to a request for a brief feasibility study to determine if the cost of ACV's could be reduced by evolving austere designs, by use of reciprocating engines rather than gas turbines, by use of non-exotic methods of construction, or by fabrication in remote areas using indigenous labor and materials. The study was not restricted to a rigid specification of vehicle performance or operating mission, but was aimed at the concept of a logistic vehicle operating over terrain similar to the Mekong Delta."

- (VII-19) "A Shallow Draft Boat for Vegetation Clogged Waters", Report No. HI-67-2, from Hydrosystems, Inc., Farmingdale, Long Island, New York (January 5, 1967) (UNCLASSIFIED) (PA 26,839).

(U) The report describes a "swamp boat" which is a shallow-draft boat designed for quiet operation in vegetation-filled waters. It is water jet propelled.

- (VII-20) McGowan, R. P., and Vanderlip, E. C., "Feasibility Investigation of Delta Recon Vehicle", Report No. 66-08, from Aberdeen Proving Ground, U. S. Army Limited War Laboratory, Mobility Branch, Aberdeen Proving Ground, Maryland (Rec'd. January 16, 1967), 12 pp (UNCLASSIFIED) (PA 27,030).

(U) "Development of an experimental ducted fan driven Delta Recon Vehicle is described. Performance characteristics were demonstrated by operation in water, over mud banks, marsh grass, and stop-and-start operation on dry grass and mud. Design considerations for a future prototype design are discussed."

CONFIDENTIAL

(This page is Unclassified)

- (VII-21) "Mekong Delta Mobile Afloat Force (MDMAF) Concept (U)", from Commander, United States Military Assistance Command, Vietnam, APO, San Francisco, California (March 13, 1966) (SECRET) (PA 27,031).

(For annotation, see I-36.)

- (VII-22) Mahone, R. M., "Personnel Protection Study on a River Patrol Boat (PBR) (U)", Report No. C-2286 (AD 377 919 L), from Department of the Navy, David Taylor Model Basin, Structural Mechanics Laboratory, Washington, D. C., for Naval Ship Systems Command, Washington, D. C. (October 1966), 29 pp (CONFIDENTIAL) (PA 27,343).

(U) "The use of honeycomb deck pads made of crushable paper on a river patrol boat (PBR) as a means of protecting standing personnel from the violent motions of an underwater explosion attack is evaluated."

- (VII-23) "Patrol Boat River (PER) Operational Evaluation (U)", from U. S. Naval Amphibious School, Coronado, San Diego, California, for Amphibious Training Command, U. S. Pacific Fleet (April 1, 1966), 18 pp (CONFIDENTIAL) (PA 27,454).

(U) This report describes the PBR's, their testing, and some of their shortcomings. It also recommends some improvements.

- (VII-24) Nelson, Andrew G., and Mosher, Norman G., "Proposed: A Counterinsurgency Task Force", U. S. Naval Institute Proceedings, pp 36-45 (June 1966) (UNCLASSIFIED) (PA 27,695).

(For annotation, see I-40.)

- (VII-25) Harrigan, Anthony, "Inshore and River Warfare", Orbis, Vol 10 (3), pp 940-946 (Fall 1966) (UNCLASSIFIED) (PA 27,701).

(For annotation, see I-41.)

- (VII-26) Harllee, J., "Patrol Guerrilla Motor Boats", U. S. Naval Institute Proceedings, Vol 90 (4), pp 70-90 (April 1964) (UNCLASSIFIED) (PA 27,864).

(For annotation, see I-42.)

- (VII-27) Endacott, Jack A., "Waterbased Counterinsurgency", a Thesis presented at the Naval War College, Newport, Rhode Island (March 2, 1964), 42 pp (UNCLASSIFIED) (PA 28,659).

(For annotation, see I-44.)

- (VII-28) Communication to C. R. Johnson, Commanding Officer, Naval Inshore Operations Training Center (Mare Island), San Francisco Bay Naval Shipyard, Vallejo, California, from A. Stein, Cornell University, Cornell Aeronautical Laboratory, Inc., Weapons Research Department, Buffalo, New York (August 3, 1967), 4 pp (CONFIDENTIAL) (PA 28,388).

VII-5

CONFIDENTIAL

CONFIDENTIAL

(VII-28) (Cont'd) (C) This describes some of the constraints connected with installation of the E8 launcher in a PBR.

(VII-29) Meyer, Richard M., "The Ground-Sea Team in River Warfare", Military Review, pp 54-61 (September 1966) (UNCLASSIFIED) (PA 28,978).

(For annotation, see I-46.)

(VII-30) Burgener, R. C., "A Survey of Methods for Detection of Swimmers, Sound, and Small Boats (U)", Report No. R-633, from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Airtronics, Inc., Washington, D. C. (August 25, 1966), 16 pp (SECRET/NOFORN) (PA 29,415).

(For annotation, see I-48.)

(VII-31) Blue Book of Coastal Vessels - Thailand, from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., Contract Nos. SD-171, and F-33657-67-C-0810 (1967), 430 pp (UNCLASSIFIED) (PA 30,194).

(For annotation, see VI-3.)

(VII-32) Rude, E. T., "Breath Inflated Boat", Final Report No. FR-407.7, from Miller Research Corporation, Baltimore, Maryland, for Aberdeen Proving Ground, U. S. Army Limited War Laboratory, Aberdeen Proving Ground, Maryland, Contract No. DA-18-001-AMC-879(X) (November 13, 1967), 6 pp (UNCLASSIFIED) (PA 30,889).

(U) "The boats fabricated during this contract are intended for scouting patrols in the delta region of South Viet Nam, where streams, rivers, and canals are major obstacles to troop movement. The boat can be used as a safety boat, to transport supplies across rivers, and for other water crossing operations. The boat can also be buried for future use."

(VII-33) Dow, Irving, and Brinton, George, "South Vietnam Coastal Patrol: A Study of Inshore Coastal Patrol Operations in Counterinsurgency Warfare (U)", Draft Report, from Westwood Research, Inc., Los Angeles, California, for Office of Naval Research, Washington, D. C., Contract No. Nonr-4962(00) (January 1967), 86 pp (SECRET) (PA 30,891).

(For annotation, see V-32.)

(VII-34) Johnson, R., and Kerstetter, D., "Summary Report on Evaluation of Patrol Boat, River (PBR) Armament (U)", Report No. NOLTR-67-15 (AD 392 445), from U. S. Naval Ordnance Laboratory, White Oak, Maryland (January 25, 1967), 87 pp (CONFIDENTIAL) (PA 30,977).

(C) "The Patrol Boat, River (PBR) is a 31-foot boat with a beam of 12.5 feet and shallow draft (<1 foot). It has a fiberglass hull and is powered by twin diesel water jet pumps. The range is 150 nautical

CONFIDENTIAL

(VII-34) (Cont'd) (C) miles at 25 knots. The mission of the boats is to patrol and secure major rivers and waterways against infiltration by enemy craft. The PBR is equipped with a twin .50 caliber machine gun mount forward, an aft mount with a single .50 caliber machine gun and a 40mm grenade launcher, and a variety of small arms."

(VII-35) "Vietnam Evaluation of PHIBPAC/NOSGPAC Drone MCM Boston Whaler (U)", from Department of the Navy, U. S. Navy Research and Development Unit, APO, San Francisco, California, for Commander, U. S. Naval Forces, Vietnam (July 26, 1967), 21 pp (CONFIDENTIAL) (PA 31,019).

(C) This test was designed to "...evaluate the feasibility of employing remote controlled drone boats for MCM in the riverine environment of South Vietnam and to provide operational data for a follow-on operational evaluation of the MDL Hydrodyne drone minesweeper.

(VII-36) Stora, Frank X., "Shallow-Draft Boats for Limited Warfare", Engineering and Environmental Test Report, from U. S. Army Transportation Research Command, Fort Eustis, Virginia, for Department of the Army, Transportation Corps, Washington, D. C. (July 1962), 137 pp (FOR OFFICIAL USE ONLY) (PA 31,166).

(FOUO) "This report covers the engineering and environmental testing of three types of shallow-draft boats equipped with various outboard propulsion systems in an area selected for its aquatic vegetation. (The boats were the Boston Whaler; Swimmer Support Boat, Mk II; and Zodiac, Mk III.) Engineering tests of boats and equipment included determination of standardization data, displacement/speed characteristics, maneuvering ability, noise level, endurance, beaching and manhandling characteristics, and fuel economy. In addition, tests were conducted to determine the capability of the craft to operate in water containing various types of aquatic vegetation and to determine the protection given the crew by hull and armor..."

(VII-37) "Operational Evaluation Mine Defense Laboratory Mine Countermeasures Drone Hydrodyne Boat (U)", Final Report No. 9-67, from U. S. Navy Research and Development Unit, Vietnam, APO, San Francisco, California 96214 (October 7, 1967), 158 pp (CONFIDENTIAL) (PA 31,291).

(For annotation, see IV-58.)

(VII-38) Berman, Thomas F., "A Boat Marking System for Use in the South Vietnamese Area (U)", Report Nos. HI-809-RR, and HI-67-203, from Hudson Institute, Croton-on-Hudson, New York, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. DAHC-67-C-0003 (June 16, 1967), 53 pp (SECRET) (PA 31,509).

(For annotation, see I-54.)

CONFIDENTIAL

(This page is Unclassified)

- (VII-39) Jane's Surface Skimmer Systems, edited by Roy McLeavy, McGraw-Hill Book Company, New York, New York (1967), 136 pp (UNCLASSIFIED) (PA 31,587).

(U) "...The need for an annual state-of-the-art report on the world's ACVs, hydrofoils, and air-lubricated materials handling system has been felt by the transport industry for some time...Our purpose is to describe and illustrate every new commercial and military air cushion vehicle, whether amphibious, seagoing, or tracked; every air-lubricated pallet and conveyor system; and every hydrofoil type..."

- (VII-40) O'Neil, G. E., and Smith, W. A., "Hydrofoil Operational Capabilities Review (U)", Report No. D2-133023-1 (AD 383 968), from The Boeing Company, Seattle, Washington, for U. S. Navy Electronics Laboratory, San Diego, California, Contract No. N123-(953)56197A (Rec'd. September 28, 1967), 173 pp (CONFIDENTIAL) (PA 31,757).

(U) "Significant progress has been made in the U. S. Navy hydrofoil research and development program. Particularly notable is the recent series of rough water tests of the PC(H)-1. It was deemed appropriate that a report be developed for presentation to operations and requirements personnel on the staff of the Chief of Naval Operations. Overall reporting should include detailed information gained from operation of PC(E)-1 during the past six months and, in addition, should include information and status regarding applicability investigations of hydrofoil ships for U. S. Navy missions."

- (VII-41) Westerman, Arthur B., Costello, John C., Jr., and Chaffee, Clarence C., "Green Book of Coastal Vessels - Thailand" (AD 824 364), from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., and Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, Contract Nos. SD-171, and F-33657-67-C-0810 (1967), 231 pp (UNCLASSIFIED) (PA 31,791).

(For annotation, see VI-4.)

- (VII-42) Westerman, Arthur B., Costello, John C., Jr., and Freudenreich, Leo B., "Green Book of Coastal Vessels - South Vietnam", from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, and Republic of Vietnam Armed Forces, The Combat Development and Test Contract Nos. SD-171, and F-33657-67-C-0810 (1967), 323 pp (UNCLASSIFIED) (PA 31,792).

(For annotation, see VI-5.)

CONFIDENTIAL

CONFIDENTIAL /NOFORN

(This page is Unclassified)

- (VII-43) Westerman, Arthur B., Costello, John C., Jr., and Freudenreich, Leo B., "Blue Book of Coastal Vessels - South Vietnam", from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, R&D Field Unit-Thailand, Bangkok, Thailand, Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, and Republic of Vietnam Armed Forces, The Combat Development and Test Center, Contract Nos. SD-171, and F-33657-67-C-0810 (1967), 556 pp (UNCLASSIFIED) (PA 31,793).

(For annotation, see VI-6.)

- (VII-44) "Fire Team Assault Boat Evaluation", Final Report (AD 819 929 L), from U. S. Marine Corps, Marine Corps Landing Force Development Center, Quantico, Virginia (September 11, 1967) (UNCLASSIFIED) (PA 31,908).

(U) "An evaluation...of various small boats was conducted to determine their suitability for Marine Corps use as Fire Team Assault Boats in a riverine environment. The boat models considered were two test models specifically designed by the Amphibian Vehicle Division, three U. S. Navy Swimmer Support Boats and a commercial Carter Craft boat. It was concluded that the Fire Team Assault Boat MK-II, developmental boat, exhibited the best overall performance and operational characteristics, and was recommended as being acceptable in its present configuration as the Fire Team Assault Boat for riverine operations..."

- (VII-45) Sargent, John F., "United States Army Shallow Draft Boat Program", Report No. 67-358, a paper presented at the American Institute of Aeronautics and Astronautics/Society of Naval Architects and Marine Engineers Advance Marine Vehicles Meeting, held at Norfolk, Virginia (May 22-24, 1967), from U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Virginia (Undated) (UNCLASSIFIED) (PA 32,132).

(U) "The increased emphasis on counterinsurgency type operations forced the Army to consider means to improve logistics in swamps and inundated areas. The intent of this consideration was to complement aerial movement of men and supplies. Although this type of ground operation has a long history in military annals, the circumstances that currently prevail force an urgency to improve mobility in that environment which is unprecedented. The unit of load arbitrarily established was a ton of supplies or a squad of troops, depending on the mission. The end item expected to carry that load had to be simple, cheap and easily reproduced. Conventional boat designs tested in heavy watergrowths proved totally inadequate; consequently, a major part of the

CONFIDENTIAL /NOFORN

(VII-45) (Cont'd) (U) effort was directed to obtaining a propulsion system which was capable of swamp negotiation as well as good open-water performance. In the propulsion study, waterjets, sine disc, paddle wheels, rule propellers, and the airscrew were tested and evaluated. The use of a unique propulsion system was further compounded by boundary requirements of minimal navigational draft, of envelope size compatible with surface and aerial delivery, and of a weight allowing manhandling over limited distances overland. Selection was finally narrowed to the waterjet and the airscrew propelled boat. Development of these two craft is currently in the final phase of tests and evaluations for field use."

(VII-46) Contractor, D. N., "Experimental Investigation of a Water Jet Propulsion System for Shallow Draft Boats", Report No. 516-2 (AD 659 814), from Hydronautics, Inc., Laurel, Maryland, for U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Virginia, Contract No. DA-44-009-AMC-893(T) (May 1966), 67 pp (UNCLASSIFIED) (PA 32,162).

(U) "This report presents the results of performance tests conducted on a water jet propulsion unit designed to propel a small craft, with one-ton payload, at a speed of 20 knots."

(VII-47) Bittner, Barry N., Climo, William H., Jr., and Wolff, Kenneth L., "Fire Support of Riverine Operations by M109 and LVTH6-A1 Embarked in LCM-8; Report of Test", Final Report (AD 821 321), Marine Corps Schools, United States Marine Corps, Marine Corps Landing Force Development Center, Quantico, Virginia 22134 (October 5, 1967), 7 pp + Appendices A Through D (UNCLASSIFIED) (PA 32,235).

(For annotation, see I-59.)

(VII-48) McMichael, S. J., Jr., "Small Craft Catalog (SMACC) (U)", Report No. NOLTR-66-25, from Department of the Navy, Naval Ordnance Laboratory, White Oak, Maryland (December 1, 1967) (CONFIDENTIAL/NOFORN) (PA 32,558).

(C/NF) "The U. S. Naval Ordnance Laboratory, White Oak, acting as the lead laboratory for the development of small craft weapons systems, published NOLTR 66-25, "Small Craft Catalog" (SMACC) (U) 1 March 1966. Numerous hull and ordnance changes since that date... necessitated this revised version of the original publication. The craft listed and data shown for each were selected on the basis of possible utility in the riverine or inshore environments. The information may not be typical of the general Navy-wide configuration of these craft. Inclusion of a craft, or description of an ordnance suit, indicates that such a craft (and armament) has been used, or may possibly have utility in these environments. It is in no way a recommendation

VII-10

CONFIDENTIAL /NOFORN

CONFIDENTIAL /NOFORN

(VII-48) (Cont'd) (C/NF) of the craft or its ordnance suit. The urgent requirement to update the original MOLTR 66-25 prevented the inclusion of many craft of possible utility. Subsequent revisions will add these craft, and newer ones, as they become known to the Laboratory."

(VII-49) Clement, Eugene P., "Model Tests of a Stepped Planing Boat With an Adjustable Stern Stabilizer", Final Report No. 2414 (AD 661 792), from Naval Ship Research and Development Center, Hydromechanics Laboratory, Washington, D. C., for Department of the Navy, Naval Ships Systems Command, Washington, D. C. (May 1967), 50 pp (UNCLASSIFIED) (PA 32,183).

(U) This report gives the test results of several variations of the first model of this type of craft which was designed and extensively tested at the Center. The effects on performance of changes in the following are shown: spray strip configuration, LCG location, weight, step depth, and after-body shape.

(VII-50) Purdy, J. B., and Feldsien, L. F., "Shallow-Draft Boats for Use on Remote Waterways in Thailand", Report No. RACIC-LR-2114, from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C., Contract No. F33657-67-C-0810 (April 1968), 8 pp (UNCLASSIFIED) (PA 32,228).

(U) "This report was prepared in response to a request for information relating to the development of a very shallow-draft boat, 4 inches or less, from...ARPA R&D Center, Thailand. The request specified criteria which are summarized as follows:

- (1) The boat should have a draft of 4 inches or less.
- (2) The boat must be capable of carrying six men with combat loads (about 1000 pounds' total).
- (3) The boat should be rugged enough to withstand rocky stream bottoms.
- (4) The boat should be capable of maneuvering against a current flow of 8 mph.
- (5) The hull must be capable of construction and repair in Thailand.
- (6) The overall cost of the hull and power plant should not exceed \$500 U. S.

In addition, the request asked for a comparison of hull materials and propulsion units that meet the above criteria..."

(VII-51) Chapman, P. O., "Evaluation of 13'3" Boston Whaler", Report No. 357 (AD 426 266 L), from U. S. Coast Guard, Field Testing and Development Unit, Baltimore, Maryland, for U. S. Coast Guard, Testing and Development Division, Office of Engineering, Washington, D. C. (December 9, 1963) (Releasable to Government Agencies Only) (PA 17,375).

VII-11

CONFIDENTIAL /NOFORN

CONFIDENTIAL

(VII-51) (Cont'd) (U) "This report covers the testing and evaluation of a proprietary 13' 3" open boat manufactured by Fisher-Pierce Company in Rockland, Massachusetts, trade name "Boston Whaler" for possible use by the Coast Guard. The boat was tested for stability, reserve buoyancy, strength and hoisting arrangement. Speed and maneuvering characteristics were evaluated in smooth water and in 1 and 3-foot chop using 9.8 and 18 HP outboard for power..."

(VII-52) Ewing, Bruce, and Myers, Hugo, "Interceptor Catamaran Proposal for Project AGILE", from Myers and Ewing, Sailing Catamarans, Sherman Oaks, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (August 5, 1962), 10 pp (UNCLASSIFIED) (PA 17,667).

(U) "The use of a range of sailing catamarans with powerful auxiliaries for intercepting junks carrying insurgent personnel and materiel is practicable. The catamarans can be significantly faster than the beamy, heavy junks for most courses and wind conditions. Being primarily sailboats, they could operate for extended periods with very limited refueling and maintenance. The catamaran's wide deck area and low angle of heel should allow easier gun handling than would be the case for small single-hulled craft. Their speed advantage and the fact that both hulls would have to be extensively damaged before the boat could be stopped would contribute to their survivability in action."

(VII-53) "Hydrofoil Craft in Naval Operations. Volume II: Non-ASW Hydrofoil Mission Survey (U)", Report No. S-8154-A, from General Dynamics Corporation, Electric Boat Division, and Convair Division, San Diego, California, for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-3393(00) (December 1963), 49 pp (SECRET) (PA 18,080).

(C) "This document is confined to an analysis of the roles that various non-ASW hydrofoils would be called upon to perform in a variety of Naval missions. The analysis of these missions together with a statement of the primary conclusions of this portion of the study constitute the main body of the report. Due to the wide variety of missions and tasks which have been considered, it has been impossible to describe each type of mission in refined detail. This is considered, however, to be consistent with the basic purpose of the mission survey, which was to determine the areas in which more detailed design studies would be warranted."

CONFIDENTIAL

CONFIDENTIAL

- (VII-54) "Hydrofoil Vehicle Costs and Capabilities (U)", Report No. C417-62-030, from General Dynamics Corporation, Electric Boat Division, Groton, Connecticut, for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-3393(00) (September 1962), 176 pp (CONFIDENTIAL) (PA 18,082).

(C) "This portion of the Analysis of Hydrofoil Craft in Naval Operations...deals almost exclusively with the sets of operational characteristics which could be incorporated in Hydrofoil Craft, together with the costs and displacements of the resulting vehicles. The operational characteristics include speed, range, endurance, seakeeping capability and payload, while cost is reported as the initial capital investment of the first ship of a class (essentially a prototype) but excluding any unusual research and development costs. A means for estimating the costs of additional boats of the same class is also presented."

- (VII-55) Chapman, P. O., "Evaluation of 13- to 15-Foot Plastic Utility Boats", Report No. 415 (AD 461 584 L), from U. S. Coast Guard, Field Testing and Development Center, Baltimore, Maryland, for U. S. Coast Guard, Testing and Development Division, Office of Engineering, Washington, D. C. (April 9, 1965) (Releasable to Government Agencies Only) (PA 18,129).

(U) Three boats are evaluated: the 13'3" Hammerhead I, the 14' Crosby Sea Sled, and the 14' MFG Skiff. Only the Hammerhead I was found suitable.

- (VII-56) Peterson, Palmer A., "Airboats (U)", Interim Report, from U. S. Army Concept Team in Vietnam, APO, San Francisco, California 96243, for U. S. Army Combat Developments Command, Fort Belvoir, Virginia (March 15, 1965), 37 pp (CONFIDENTIAL) (PA 18,805).

(U) "The purpose of the evaluation was to determine if the use of airboats would increase the capability of the Army of the Republic of Vietnam (ARVN) to intercept insurgent forces operating in inundated areas containing aquatic grasses." See also VII-61.

- (VII-57) "The Hovercraft Principle", Far East Engineering and Equipment News, pp 41-42 (January 1966) (UNCLASSIFIED) (PA 21,082).

(U) "...This article gives an introduction to the basic principles of hovercraft design and discusses what constitutes an efficient system and how to relate it to a range of probable duties."

- (VII-58) Pifer, Barry G., "Full-Scale Seaworthiness Tests of a 52-Foot Landing Craft Swimmer Reconnaissance (LCSR) (U)", Final Report No. C-2093 (AD 369 316), from U. S. Navy, David Taylor Model Basin, Hydromechanics Laboratory, Washington, D. C., for Department of the Navy, Bureau of Ships, Washington, D. C. (January 1966), 23 pp (CONFIDENTIAL) (PA 22,603).

CONFIDENTIAL

CONFIDENTIAL

(VII-58) (Cont'd) (C) "Seaworthiness tests were conducted on the 52-foot Landing Craft Swimmer Reconnaissance (LCSR) in a State 3 sea off Virginia Beach, Virginia in November 1963. Pitch, roll, and vertical accelerations at three longitudinal positions were measured. Statistical results derived from the recorded test data as well as conditions observed during the tests are reported. The results indicate that the LCSR has reasonably good seaworthiness characteristics."

(VII-59) Clark, Dorothy K., and Giarratana, Angelo C., "Transportation Systems of Thailand", Report No. RAC-TP-180(FOT) (AD 484 200), from Research Analysis Corporation, McLean, Virginia, for Advanced Research Projects Agency, Washington, D. C., Contract No. DA-49-083-OSA-3107 (June 1966), 105 pp (UNCLASSIFIED) (PA 22,678).

(For annotation, see III-31.)

(VII-60) Dow, Irving, Brinton, George, and Krisel, Lionel, "Analysis of Potential Requirements for Counterinsurgent River Warfare Operations in Laos (U)", prepared for Office of Naval Research and Naval Research Laboratory, Washington, D. C., by Westwood Research, Inc. (June 1967) (CONFIDENTIAL) (PA 34,022).

(For annotation, see I-74.)

(VII-61) Kennedy, James D., and Dryer, John E., "Airboats (U)", Final Report (AD 372 880), from U. S. Army, U. S. Army Concept Team in Vietnam, APO, San Francisco, California 96243, for U. S. Army, U. S. Army Combat Developments Command, Fort Belvoir, Virginia (April 15, 1966), 63 pp (CONFIDENTIAL) (PA 23,590).

(C) "The purpose of the evaluation was to determine if the use of airboats would increase the capability of the Army of the Republic of Vietnam (ARVN) to intercept insurgent forces operating in inundated areas containing aquatic grasses." See also VII-56.

(VII-62) Bhangsba, Sorasan, "Evaluation and Engineering Tests of the Shallow-Draft Boat in Thailand", Report No. 66-021 (AD 485 582), from Joint Thai-U.S. Military Research and Development Center, Bangkok, Thailand, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (May 1966), 75 pp (UNCLASSIFIED) (PA 24,566).

(U) "A shallow-draft boat, based on the local canal (klong) boat, was designed and constructed by the Military Research and Development Center in Thailand. Test boats were equipped with various commercial outboard motors. Engineering tests were conducted to determine the boats' maneuverability, fuel consumption, endurance, beaching and manhandling characteristics, and transportability."

SECRET

(This page is Confidential)

- (VII-63) Thomson, Donald C., "Small Boat Noise Investigation (Noise Survey of LCP(L) MK 4, LCP(L) MK 11, PCF (Swift), and 25-Foot Bertram) (U)", Report No. MEL-RD-204/66 (AD 376 228 L), from U. S. Navy, Navy Marine Engineering Laboratory, Annapolis, Maryland, for Department of the Navy, Bureau of Ships, Washington, D. C. (September 1966), 77 pp (CONFIDENTIAL) (PA 26,148).

(C) "The radiated airborne and waterborne noise levels of four boats were measured and recorded during acoustic trials in San Diego Bay: a 36-foot LCP(L) MK 4, a 36-foot LCP(L) MK 11, a 25-foot Bertram, and a 50-foot PCF. A newly constructed, acoustically treated LCP(L) MK 11 was evaluated during acoustic trials in the Miami Marine Stadium. Comparisons between the standard LCP(L) MK 11 and the acoustically treated LCP(L) MK 11 were made to determine the effectiveness of the acoustic treatment. The airborne and waterborne broadband noise levels, corrected to 100-yard distance, are presented in polar graphs. Octave-band analyses of the noise radiated abeam the boats and the onboard noise and vibration levels are also presented. Recommendations are given for reducing the noise levels of each boat..."

- (VII-64) "Shallow-Draft Boats", Interim Report No. TIR-30.8.1.1(2), from University of Pittsburgh Research Staff, Washington, D. C., for U. S. Army Materiel Command, Research and Development Directorate, Washington, D. C., Contract No. DA-49-186-AMC-214(D) (January 1967), 18 pp (FOR OFFICIAL USE ONLY) (PA 26,528).

(FOUO) "This Technical Information Report traces the background and the development to date of shallow-draft boats, their engines, and their propulsion systems. These boats are to be used in conventional and special warfare. A variety of hulls, engines, and propulsion units are mentioned, including the combination aluminum hull and airscrew propulsion system that was tested with satisfactory results in 1964. Two new hulls, one of aluminum and the other of fiber glass, are being tested with water-jet propulsion units. The results of tests will determine which, if any, of these boats are selected for Army use."

- (VII-65) McGowan, Robert P., and Vanderlip, Edward G., "Feasibility Investigation of Delta Recon Vehicle", Final Report No. 66-08 (AD 804 781 L), from U. S. Army, Aberdeen Proving Ground, U. S. Army Limited War Laboratory, Mobility Branch, Aberdeen Proving Ground, Maryland (Rec'd. May 29, 1967), 62 pp (UNCLASSIFIED) (PA 27,468).

(U) "Development of an experimental ducted fan-driven Delta Recon Vehicle is described. Performance characteristics were demonstrated by operation in water, over mud banks, marsh grass, and stop-and-start operation on dry grass and mud. Design

VII-15

SECRET

SECRET

(VII-65) (Cont'd) (U) considerations for a future prototype design are discussed. Operating characteristics proposed in a draft Small Developments Requirement are considered feasible."

(VII-66) "5th Annual Military Systems Directory", Armed Forces Management (April 1967) (UNCLASSIFIED) (PA 28,500).

(For annotation, see I-67.)

(VII-67) Logan, Robert S., Webber, Wendell E., and Wilens, Martin B., "Vietnam Evaluation Personnel Air Cushion Vehicle (PACV) (U)", Final Report (AD 379 188), from U. S. Navy Research and Development Unit, APO, Vietnam, for Department of the Navy, Chief of Naval Operations (OP-345), Washington, D. C. (January 29, 1966), 167 pp (CONFIDENTIAL) (PA 28,673).

(For annotation, see I-68.)

(VII-68) Salter, Richard, et al., "Vietnam Research Studies, Volume I: Plain of Reeds Warfare (U)", Final Report No. PRC-906 (AD 382 631), from Planning Research Corporation, Los Angeles, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (September 15, 1966), 125 pp (CONFIDENTIAL) (PA 28,708).

(For annotation, see I-69.)

(VII-69) Kasper, Marvin, and Roccati, Laurene, "Armament Catalog for Small Craft Application (U)", Report No. NOLTR-66-154 (AD 380 775 L), from U. S. Navy, U. S. Naval Ordnance Laboratory, White Oak, Silver Spring, Maryland, Contract No. N60921-7129 (December 7, 1966), 227 pp (SECRET) (PA 29,559).

(S) "As lead laboratory in the small craft armament field, the U. S. Naval Ordnance Laboratory has the responsibility for specifying optimum weapon suits for these craft to enable them to accomplish their intended missions. The weapon systems and appropriate ammunition included in this catalogue represent a broad array of weapons which could conceivably be employed. The catalogue includes those weapons which satisfy general weight and size limitations of small craft. In many cases, however, the weapons would require major modifications to make them compatible with small craft. Other constraints, not considered in assembling the catalogue, may preclude their use on small craft. In some cases, weapon specifications are missing because of unavailable data. These missing data will be added, insofar as possible, in subsequent revisions. In most cases, accuracy data from source documents were either unavailable or stated differently in each source document. For this reason, accuracy data were converted, wherever possible, to circular probable error (CEP)."

UNCLASSIFIED

- (VII-70) "VA-3 Air Cushion Vehicle Operational Tests at Norfolk, Virginia", Final Report No. RAC-2954 (AD 808 862 L), from Republic Aviation Corporation, Farmingdale, Long Island, New York, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. NObs-4848 (May 19, 1965), 29 pp (UNCLASSIFIED) (PA 29,721).

(For annotation, see IV-62.)

- (VII-71) Chey, Young, "Model Tests of a Series of Six Patrol Boats in Smooth and Rough Water", Report No. 985, from Stevens Institute of Technology, Davidson Laboratory, Castle Point Station, Hoboken, New Jersey, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. NObs-78349, T/O 14 (October 1963), 31 pp (UNCLASSIFIED) (PA 29,911).

(U) "Three round-bottom models and three hard-chine models, with length-beam ratios of 3, 4 and 5 in each group and with constant displacement, were tested in smooth water and in irregular waves of Sea States 3 and 5. The hard-chine model and the round-bottom model of length-beam ratio 4 were used to evaluate relative broaching tendencies in regular following waves. The resistance data in smooth and rough water were expanded to boat weights of 55,000 pounds. The measured values of accelerations, at the forward quarter point and LCG position, and of heave, are presented. In the evaluation of relative broaching tendencies in regular following waves, experimental results were combined with theoretical results to derive indices of broaching."

- (VII-72) Cuthrell, C., "Evaluation of 25' 8" Motor Cargo Boat (Plastic)", Report No. 458 (AD 653 284), from U. S. Coast Guard, Office of Engineering, Washington, D. C. (May 26, 1967) (UNCLASSIFIED) (PA 30,110).

(U) "This project was established to carry out a one-year operational evaluation of four prototype motor cargo boats (plastic) under normally assigned operating conditions and requirements. The desired result of this supervised operational evaluation is information to assist in the decision making concerning the production of this type boat. Phase I of the project covers extensive familiarization and testing of the first of the four prototype boats by Field Testing and Development Center. Phase II will be the field evaluation of the four boats by operating personnel. This report covers only Phase I testing and standardization trials and tests performed by the Coast Guard Yard. A photographic record of most of the tests was maintained and is included..."

UNCLASSIFIED

UNCLASSIFIED

- (VII-73) Smith, Richard H., Hines, Ralph T., and Ezzard, Richard D., "Integrated Engineering/Service Test of Boat, Shallow Draft, Air Propelled", Final Report (AD 805 559 L), from Department of the Army, General Equipment Test Activity, Fort Lee, Virginia, for U. S. Army Mobility Equipment Command, St. Louis, Missouri (December 1966), 243 pp (UNCLASSIFIED) (PA 30,376).

(U) This test "...was conducted from 25 October 1965 through 19 August 1966 to determine the technical performance and safety characteristics of the boat and its associated tools and test equipment, and to determine the suitability of the boat and its maintenance package for use by the Army. Two deficiencies and many shortcomings were found."

- (VII-74) Stora, Frank X., Carus, Frank, and Fama, Rocco, "Evaluation of Pneumatic Boats for Limited Warfare", Report No. TRECOM-TR-63-20 (AD 405 597 L), from U. S. Army, Transportation Research Command, Fort Eustis, Virginia (May 1963), 52 pp (FOR OFFICIAL USE ONLY) (PA 30,549).

(FOUO) "This report covers the testing of five types of pneumatic boats for use in unconventional warfare operations. The tests were conducted during September and October 1962 and covered canal, swamp, river and stream, and surf operations. Durability of the boats was assessed on land and in shallow water and while they were being rammed and towed. Characteristics of the pneumatic boats are shown..."

- (VII-75) "LCA - Landing Craft Assault", from FMC Corporation, Ordnance Division, San Jose, California (Rec'd. November 3, 1967), 6 pp (UNCLASSIFIED) (PA 30,554).

(U) "The Landing Craft Assault (LCA) is a multi-purpose amphibian for the transfer of personnel and cargo ashore in the assault phase of an amphibious operation. From an LSD or LPD offshore, the LCA can cross rough water, surf zone, difficult beaches, sand dunes, and inland terrain normally encountered in land operation. In water, the LCA is driven by two propellers; on land, its tracks provide excellent mobility over difficult terrain. The craft has a welded, aluminum hull. The lightweight design enables it to carry a payload equal to 78.5 percent of its fully fueled curb weight."

- (VII-76) Wallace, William B., "Marine Jet Propulsion", Product Engineering (June 11, 1962), pp 100-102 (UNCLASSIFIED) (PA 30,555).

(U) "So far three major jet designs have been developed: axial flow, centrifugal flow, and a mixed flow that is 45 degrees between axial and centrifugal. Axial flow

CONFIDENTIAL

(VII-76) (Cont'd) (U) is by far the most popular and jets of this design are offered by several companies. At present only one centrifugal jet and one mixed-flow jet are on the market."

(VII-77) Kingsbury, C. W., "Trip Report - Borneo - To Observe SRN-5 Hovercraft Trials (U)", from Advanced Research Projects Agency, R&D Field Unit, APO, San Francisco, California 96346 (July 8, 1965), 37 pp (CONFIDENTIAL) (PA 30,933).

(C) The SRN-5 was evaluated by the British in three operational roles: general logistic support, coastal operations, and quick reinforcement with men and supplies including tactical redeployment.

(VII-78) "Riverine Warfare (U)", Interim Report (AD 382 219 L), from Marine Corps Schools, Marine Corps Landing Force Development Activities, Quantico, Virginia (June 29, 1967), 10 pp (CONFIDENTIAL) (PA 31,557).

(For annotation, see I-71.)

(VII-79) "Fast Patrol Boat (PTF) and Hydrofoil Patrol Boat (PGH) Study (U)", from Department of the Navy, Office of the Chief of Naval Operations, Strike Warfare Division (OP-34), Washington, D. C. (March 28, 1964), 45 pp (SECRET) (PA 31,898).

(U) The study was to analyze "...the relative merits of Fast Patrol Boats (PTF) and Hydrofoil Patrol Boats (PGH) in the performance of special operations missions, including a determination of recommended program objectives, operational employment, manning and training, support considerations and strategic deployment for operations in the Cold War."

(VII-80) Carson, R. J., and Tighe, W. F., Jr., "Developments and Problems in Coast Guard Cutter Construction", Naval Review - 1964, pp 175-197 (UNCLASSIFIED) (PA 32,343).

(U) This study describes the improvements being made in new construction ships by the Coast Guard.

(VII-81) "Armbruster, Frank, "A Gunboat for Riverine Warfare in Guerrilla Areas", Report No. HI-898-RR, from Hudson Institute, Inc., Croton-on-Hudson, New York, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. DAHC04-67-C-0003 (September 22, 1967), 33 pp (UNCLASSIFIED) (PA 32,401).

(U) "The basic plan was to provide a gunboat of shallow draft (24 inches) and a very low silhouette (a freeboard of 24 inches) with sloping side plates representing a target of 45° or less to flat-trajectory weapons and protected overall with steel armor. The gunboat would mount an armored turret from an obsolescent tank or self-propelled artillery piece. The two turrets designated for the design-feasibility sketches are the 90-mm gun M48 tank turret and the 105-mm howitzer

VII-19

CONFIDENTIAL

CONFIDENTIAL

(This page is Unclassified)

- (VII-81) (Cont'd) (U) M108 self-propelled gun turret. But even older tank turrets (the 105 howitzer turrets from the old World War II M4's would perhaps be ideal) could be used. The basic design is that of the original Civil War Monitors (which were designed against a flat-trajectory threat), but with modern advantages, including a coaxial machine gun for ranging and correcting for "point-blank" fire of the master gun." See also VII-88, which is Appendix I to this report.
- (VII-82) Von Ritschl, R. J. M., "Shallow Draft Boat With Crusader Engines and Tamco 'Aqua-Jet' for Limited Warfare", Final Report No. 2 (AD 821 652 L), from Tamco Manufacturing Inc., Marine and Bridge Division, Military Department, Detroit, Michigan, for Department of the Army, U. S. Army Mobility Equipment Command, U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Virginia, Contract No. DA-44-009-AMC-1833(T) (March 21, 1967), 51 pp (UNCLASSIFIED) (PA 32,413).
- (U) "This report covers the investigation of a Tamco 23-foot, 6-inch fiberglass ski barge (by Kenner) equipped with twin 100 HP Crusader Marine gasoline engines and twin Tamco multi-stage 'Aqua-Jet' water-jet propulsion systems for shallow draft operations..."
- (VII-83) Boyle, John M., "Arming Small Boats With 2.75-Inch Folding Fin Aircraft Rockets (U)", Report No. IDP-1737, from U. S. Naval Ordnance Test Station, Development Division 4, China Lake, California (Rec'd. April 24, 1968), 4 pp (CONFIDENTIAL) (PA 32,536).
- (U) The report considers the possibility of using the 2.75-inch FFAR on a small high-speed boat.
- (VII-84) Boyle, John M., and Baker, Eugene B., "Project SWAB (Shallow-Water Attack Boat) (U)", Report No. NWC-TP-4495, from U. S. Naval Ordnance Test Station, Aviation Ordnance Department, China Lake, California (December 1967), 44 pp (CONFIDENTIAL) (PA 32,599).
- (U) "The SWAB is a fast, heavily-armed, difficult-to-detect, experimental seacraft for use in coastal waters. This report...discusses the...design, fabrication, radar cross-section, weight-reduction program, and test program."
- (VII-85) "Amphibious Vehicle Studies", Report No. TRG-031-FR (AD 647 085), from TRG, a Division of Control Data Corporation, Melville, New York, for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-4650(00) (June 1966), 39 pp (UNCLASSIFIED) (PA 32,771).
- (U) "This report describes theoretical work aimed at increasing the speed of amphibious vehicles in the water, by decreasing resistance and (if grousers are used for propulsion) improving the flow to the grousers. Alternate mathematical models of the flow

CONFIDENTIAL

CONFIDENTIAL

(VII-85) (Cont'd) (U) were examined and it was concluded that a simple block singularity model gave the best fit to measured resistance data. Although the fit is not very good, and although the mathematical model does not represent the vehicle shape very accurately, it was decided that the model was good enough to serve as a basis for the design of hull modifications intended to reduce drag (and improve the flow to the grouser region). A bulb-like singularity modification was designed mathematically and showed a substantial calculated resistance reduction...Due to lack of funds it was not possible to examine the corresponding modified hull shape, nor to conduct any model tests, but the theoretical results suggest that further work in this direction would be profitable..."

(VII-86) Ragot, Robert L., et al., "Amphibious Assault Landing Craft Program (S14-17) Prior Craft Review. Volume 4 - Appendix A: Small Landing Craft, Boats and Planing Craft (Under 51 Feet) (U)", Report No. C2428 (AD 386 987 L), from U. S. Navy, Naval Ship Research and Development Center, Marine Engineering Laboratory, Annapolis Division, Annapolis, Maryland, for Department of the Navy, Washington, D. C. (January 1968), 138 pp (CONFIDENTIAL) (PA 32,948).

(C) "Volume 4 of the Prior Craft Review is one of 6 volumes of vehicle and craft data, and presents characteristic data, pictorial information, performance curves, engine characteristics, and weight data for six landing craft and planing craft under 51 feet in length. The main purpose of the Prior Craft Review is to consolidate information about the craft and thereby provide a useful data base for analyses to compare design features, performance, powering, and operating economy of present landing craft and vehicles with the same features and characteristics of advanced craft designs."

(VII-87) Brown, John R., and Thornburg, Frank L., "Investigation of Waterjet Fouling", Final Report No. 19196, from Lockheed-California Company, Burbank, California, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. NObs-92486, ARPA Order No. 607 (December 1965), 98 pp (UNCLASSIFIED) (PA 25,050).

(U) "There is an immediate requirement for a marine surface vehicle of very shallow draft, capable of operations in river, delta, and coastal waters, which will successfully penetrate heavy weed concentrations, will be free from damage by heavy debris or groundings, and has a high speed dash capability as well as an efficient cruise speed. The propulsion system must also permit clandestine operations. It is the latter feature which makes a waterjet propulsion system an attractive candidate if it can be modified in some reasonable fashion to handle the weed-infested water requirement. This research and test program has been directed toward the solution of this problem."

VII-21

CONFIDENTIAL

CONFIDENTIAL

- (VII-88) Armbruster, Frank E., "A Gunboat for Riverine Warfare in Guerrilla Areas (U)", Report Nos. HI-67-273, and HI-898-RR, Appendix I, from Hudson Institute, Inc., Croton-on-Hudson, New York, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. DAHCU4-67-C-0003 (September 22, 1967), 3 pp (CONFIDENTIAL) (PA 32,538).

(For annotation, see VII-81; this document is merely an appendix.)

- (VII-89) Rosenthal, K. W., "Shock Test of United Boat Builders Inc., 31 Foot River Patrol Boat (PBR) (U)", Report No. 11-67 (AD 385 345 L), from San Francisco Bay Naval Shipyard, Hunters Point, San Francisco, California (March 1967), 62 pp (CONFIDENTIAL) (PA 32,577).

(C) "A Routine Small Boat Shock Test of a fiberglass 31-foot PBR manufactured by United Boatbuilders Inc., Bellingham, Washington, was conducted at the West Coast Shock Facility, San Francisco Bay Naval Shipyard. Shock loadings were applied to the PBR using the standard five (5) shot test series for heavyweight equipment on Floating Shock Platforms...For this type of testing the hull of the PBR is essentially strong enough as only seepage cracks resulted from shock. The engines, fuel tanks and exhaust piping required shock hardening modifications to improve the boat to a point where it would be capable of returning to its base after underwater shock. Shock hardening modifications were accomplished and proven satisfactory on the engines' front support system, muffler and exhaust system. However, no shock hardening was attempted on the engines' rear support system or the fuel tanks."

- (VII-90) Miller, E. R., Scherer, J. O., and Barr, R. A., "A Parametric Study of High Speed Support Amphibians", Report No. 615-1 (AD 667 251), from Hydronautics, Inc., Laurel, Maryland, for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. N00014-66-C0329 (February 1968), 224 pp (UNCLASSIFIED) (PA 33,548).

(U) "This report presents the results of a parametric study of high speed support amphibians. The vehicle types considered include planing hulls, hydrofoils, hydrokeels, captured air bubble craft and catamarans. The parameters considered include vehicle dimensions, speed, range, payload and machinery characteristics. Emphasis was placed on hydrodynamic characteristics and waterborne performance. The parametric results were obtained through the use of computer aided conceptual design models for each of the vehicle types..."

UNCLASSIFIED

(VII-91) "Naval Review - 1968", edited by Frank Uhlig, Jr., U. S. Naval Institute, Annapolis, Maryland (1968) (UNCLASSIFIED) (PA 33,727).

(For annotation, see I-75.)

(VII-92) O'Callaghan, Paul, "Kenner Ski Barge (1 October 1967)", Final Report No. ACG-5/68 (AD 826 893), Army Concept Team in Vietnam, Department of the Army, APO, San Francisco 96384 (January 30, 1968), 4 pp & Enclosures (UNCLASSIFIED) (PA 32,897).

(U) "The Kenner Ski Barge is a flat bottom, fiberglass, shallow draft boat powered by an outboard motor or motors. It has three layers of expanded polystyrene foam built in between deck and hull for greater flotation. The deck is above the waterline, therefore the boat is self bailing when not loaded above rated capacity. The sides are thin laminated fiberglass, about one-half inch thickness, topped by a raised aluminum handrail..."

VII-23 and VII-24

UNCLASSIFIED

SECRET/NOFORN

SECTION VIII

SWIMMER ATTACKS (U)

SECRET/NOFORN

SECRET

(This page is Unclassified)

SECTION VIII

SWIMMER ATTACKS (U)

- (VIII-1) "Sonic Defense Against Swimmers", from Office of the Secretary of Defense, Advanced Research Projects Agency, R&D Field Unit-Vietnam, APO, San Francisco, California, for Director, Joint Research and Test Activity, Vietnam (September 21, 1965) (UNCLASSIFIED) (PA 18,636).

(U) This study was designed to gather all "available information pertinent to the feasibility of utilizing low frequency, high intensity sound as a deterrent to underwater swimmers...the state of the art is such as to preclude any application of sound as a defense against swimmers in the foreseeable future except insofar as sonic detection systems are married to other injury inflicting means such as the use of explosives..."

- (VIII-2) "Project PEBBLE. A Study of Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume I: Assumptions, Conclusions and Recommendations (U)", from National Academy of Sciences, National Research Council, Mine Advisory Committee, Washington, D. C. (November 1965) (SECRET/NOFORN) (PA 21,378).

(For annotation, see I-20. See also I-21 and I-73.)

- (VIII-3) "Swimmer Countermeasures: A Collection of Unpublished Work (U)", Report No. NRC:MAC:2021, from National Academy of Sciences, National Research Council, Mine Advisory Committee, Washington, D. C. (April 1966) (SECRET) (PA 22,031).

(U) The committee published this report in order to make available to a wider audience a number of reports which had received very limited distribution.

- (VIII-4) "Project PEBBLE. Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume III: Bibliography (U)", Final Report No. NRC:MAC:2019 (AD 371 950 L), from National Academy of Sciences, National Research Council, Mine Advisory Committee, Project PEBBLE Study Group, Washington, D. C. (March 1966) (CONFIDENTIAL) (PA 22,032).

(For annotation, see I-21. See also I-20 and I-73.)

VIII-1

SECRET

SECRET

- (VIII-5) Lauderdale, C. L., and Ragan, J. H., "Development of Swimmer Acoustic Test Set", Final Report No. 282 (AD 478 142), from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Bureau of Ships, Washington, D. C. (January 1966), 31 pp (UNCLASSIFIED) (PA 22,869).

(U) "A portable sound pressure level measuring set (Swimmer Acoustic Test Set) has been developed at the U. S. Navy Mine Defense Laboratory to permit measurement of the acoustic output of self-contained underwater breathing apparatus, swimmer support craft, and related equipment."

- (VIII-6) Brumbaugh, D. A., Kirkland, J. T., and Muller, J. A., "Analysis of Threat in Inshore Undersea Warfare (U)", Report No. 259 (AD 359 248 L), from Operations Research, Inc., Silver Spring, Maryland, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. N0bsr-89164 (January 20, 1964), 84 pp (SECRET) (PA 23,791).

(For annotation, see I-25.)

- (VIII-7) "CIRADS Proceedings (U)", Volume I, Part 1, held June 14-16, 1966, Arlington, Virginia (AD 376 000), from The University of Michigan, Willow Run Laboratories, Infrared Physics Laboratory, Ann Arbor, Michigan, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-91 (September 1966), 596 pp (SECRET) (PA 24,028).

(U) The cited proceedings contain a paper entitled
"(U) Defense Against Underwater Swimmer Attack"
(SECRET) by S. B. Marley and R. W. Denton of the
Navy Mine Defense Laboratories.

- (VIII-8) Ledgerwood, F. A., "Swimmer Countermeasures; A Review and Proposed RDT&E Program (U)", R&D Report No. 222 (AD 345 960 L), from U. S. Navy Mine Detection Laboratory, Panama City, Florida, for Department of the Navy, Bureau of Ships, Washington, D. C. (December 1963), 24 pp (SECRET) (PA 24,295).

(S) "In limited wars or police actions, attacks against ships in port by underwater saboteurs are very likely. At the present time there is no adequate defense against such attacks. A review of existing and possible swimmer measures and counter-measures techniques is provided which leads to the conclusion that acoustic doppler detection coupled with explosive destruction is the most promising antiswimmer technique. Recommendations are included for short-and long-range RDT&E programs which it is believed can lead to an interim and ultimately an adequate solution to the swimmer threat."

- (VIII-9) Hartmann, G. K., "The Physical Aspects of Underwater Explosion Damage to Swimmers", Report No. NRC:CAO:0034 (AD 15 040), from National Research Council, Committee on Amphibious Operations, Washington, D. C., for Panel on Underwater Swimmers, Washington, D. C. (January 1953), 47 pp (UNCLASSIFIED) (PA 24,543).

VIII-2

SECRET

CONFIDENTIAL

(VIII-9) (Cont'd) (U) "The Panel on Underwater Swimmers, in its review of problems of underwater swimmers, was faced with several conflicting theories and widely scattered data on the mechanisms of damage to underwater man from explosions. In addition to an assessment of the level of our present knowledge, this report attempts to examine the several existing theories and list the data known to exist in support of them. In view of the urgent need of operational swimmers to judge the risk from underwater explosion, simplified formulas for computing deterrent and lethal distances from various size explosions are also given. It is hoped that these also will be useful to those concerned with countermeasures against enemy swimmer operations..."

(VIII-10) "A Handbook of U. S. Naval Systems and Operations (U)", Report No. ONR-ACR-NAR-30, from Department of the Navy, Office of Naval Research, Naval Analysis Group, Washington, D. C. (June 1965) (SECRET/NOFORN) (PA 25,120).

(For annotation, see I-33.)

(VIII-11) Marley, Shyne B., and Denton, Robert W., "Defense Against Underwater Swimmer Attack (U)", U. S. Navy Mine Defense Laboratory, Panama City, Florida, 6 pp (SECRET) (PA 26,096).

(U) This paper ranges widely over the subject area, describing environments of several areas in the RVN, anti-swimmer net tests, small boat sonar tests, and a number of other subjects.

(VIII-12) Gorman, John D., and Baker, Harry J., "Design and Evaluation of a Swimmer Deterrent Device (U)", Final Report, Test and Evaluation Report 305 (AD 376 266 L), United States Navy Mine Defense Laboratory, Panama City, Florida (September 1966), 13 pp (CONFIDENTIAL) (PA 26,197).

(C) "In recognition of the increasing threat of covert subsurface swimmers, the U. S. Navy Mine Defense Laboratory tested various types of lightweight nylon nets to determine their effectiveness as a deterrent to swimmer attack."

(VIII-13) Radford, James E., "Quick-Fix Antiswimmer Weapon Development (U)", NOLTR 66-176 (AD 377 371 L), U. S. Naval Ordnance Laboratory, White Oak, Silver Spring, Maryland 20910, for U. S. Naval Ordnance Systems Command, Washington, D. C. 20360 (August 25, 1966), 27 pp (CONFIDENTIAL) (PA 26,468).

(C) "The threat of enemy swimmers in the Southeast Asia operation prompted U. S. Naval Ship Systems Command to request an urgent program for the development of an antiswimmer weapon system. The Naval Ordnance Laboratory was requested by U. S. Naval Ordnance Systems Command to outline a 12-18 month quick-fix program for an antiswimmer weapon. In consideration for the urgency of the program,

CONFIDENTIAL

CONFIDENTIAL

- (VIII-13) (Cont'd) (C) only off-the-shelf weapons which could be adapted for antiswimmer use were considered. This report covers the effort put forth to select a weapon, procurement of hardware, modification and development of components, and the tests involved in development of the antiswimmer weapon.
- (VIII-14) Gray, Richard T., and Lighton, Paul G., "Vietnam Evaluation-Trammel Anti-Swimmer Net (U)", Final Report, from U. S. Navy Research and Development Unit-Vietnam, APO, San Francisco, California 96243, for U. S. Navy Forces, Vietnam (May 2, 1966), 25 pp (CONFIDENTIAL) (PA 27,325).

(U) "The purpose of this project was to evaluate the effectiveness and utility of the anti-swimmer net as a swimmer countermeasure device in the harbors and rivers of the Republic of Vietnam."

- (VIII-15) "Shallow-Water Naval Warfare-Analysis of Threats and Capabilities (U)", Report No. NRC-MAC-2025 (AD 378 140 L), from National Academy of Sciences, National Research Council, Mine Adviscry Committee, Washington, D. C., for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-2300(1G) (November 1966), 102 pp (SECRET/NOFORN) (PA 27,453).

(For annotation, see I-38.)

- (VIII-16) Jaffe, Herbert, and Shatunoff, Stanley, "Underwater Swimmer Missions Analysis (U)", Final Report No. FHR-3178 (AD 376 915 L), from Fairchild Hiller, Republic Aviation Division, Farmingdale, Long Island, New York, for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-4865(00) (December 15, 1965), 141 pp (CONFIDENTIAL) (PA 28,430).

(C) This study considered the swimmer problem in the following general topics:

- "a) Review of swimmer missions and tasks using the Naval Weapons Instruction Procedures (NWIP) as guidelines
- b) Influence of geographical aspects
- c) Human factors considerations
- d) Problem of underwater navigation
- e) Surveillance aspects
- f) Effect of enemy countermeasures
- g) Problem of communications
- h) Roles of reliability, training, and checkout systems..."

- (VIII-17) Burgener, R. C., "A Survey of Methods for Detection of Swimmers, Sound, and Small Boats (U)", Report No. R-633, from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Airtronics, Inc., Washington, D. C. (August 25, 1966), 16 pp (SECRET/NOFORN) (PA 29,415).

(For annotation, see I-48.)

CONFIDENTIAL

- (VIII-18) "An Integrated-Systems Approach to Swimmer Detection and Classification (U)", Report No. DRL-A-278 (AD 380 535 L), from The University of Texas, Defense Research Laboratory, Austin, Texas, for Department of the Navy, Office of Naval Research, Washington, D. C., Contract No. Nonr-3579(01)-9 (March 27, 1967), 73 pp (CONFIDENTIAL) (PA 29,598).

(C) "...In guerrilla-type warfare the enemy often does not have available to him the more conventional methods of offensive warfare against ship targets. In this case swimmer attacks can be expected to be an even greater threat...This report brings together a discussion of four techniques which can form the basis of an integrated approach to the swimmer detection problem."

- (VIII-19) "Conduct an Operational Evaluation of Mine Hunting and Surveillance System S2602; EOD Swimmer Subsystem (U)", Final Report Secret Supplement (January 1966 - August 1966) (AD 377 422 L), from Department of the Navy, Commander, Operational Test and Evaluation Force, Norfolk, Virginia, for Department of the Navy, Chief of Naval Operations, Washington, D. C. (November 14, 1966), 11 pp (SECRET/NOFORN) (PA 30,338).

(For annotation, see IV-54.)

- (VIII-20) Coggins, T. M., "Swimmer Equipment Survey (U)", Interim Report No. i-134 (AD 383 745 L), from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Naval Ship Systems Command, Washington, D. C. (August 1967), 47 pp (CONFIDENTIAL) (PA 31,538).

(U) "This report documents the status to June 1967 of swimmer equipment, current or planned, for use in the underwater environment. Listing is by category as follows: (1) swimmer basic equipment, (2) swimmer communications, (3) underwater vehicles and submersibles, (4) navigation and reconnaissance, and (5) support equipment...The purpose of this report is to document the status of equipments for the combat swimmer, for information and as an aid in planning for agencies concerned."

- (VIII-21) Mairs, Robert, and Bright, Chester, "Potential Uses of a Swimmer Operated Craft in Oceanography and Riverine Warfare (U)", Report No. IR-67-58 (AD 383 730 L), from U. S. Naval Oceanographic Office, Research and Development Department, Coastal Oceanography Branch, Washington, D. C. (August 1967), 13 pp (SECRET) (PA 31,552).

(For annotation, see I-55.)

- (VIII-22) Clapham, Robert, "A Final Report on the Infrared Detection Tests for Antiswimmer System (U)", Document No. 1679 (AD 383 820 L), from Honeywell, Inc., Ordnance Division, Aerospace and Defense Group, Seattle, Washington, for U. S. Navy Mine Defense Laboratory, Panama City, Florida, Contract No. N61339-67-C-0037 (June 2, 1967) (SECRET) (PA 31,555).

CONFIDENTIAL /NOFORN

- (VIII-22) (Cont'd) (U) "Swimmer-detection tests were performed using a modified Honeywell infrared scanner to determine the feasibility of detecting a swimmer on or near the surface of the water."
- (VIII-23) Berryman, John L., Jr., and Haulman, C. Austin, "Characteristics of Key Ports of South Vietnam and Analysis of Specific Ship Defense Problems (U)", Report No. 336 (AD 385 209 L), from U. S. Navy Mine Defense Laboratories, Panama City, Florida (August 1967), 138 pp (SECRET/NOFORN) (PA 31,954).
- (C/NF) This study was designed: "(1) to collect and analyze geographical information and environmental data for the South Vietnam ports of Hue, Da Nang, Chu Lai, Qui Nhon, Nha Trang, Cam Ranh, Phan Rang, Vung Tau, Nha Be, Saigon, and Can Tho, in order to establish the operational background for the development of a swimmer surveillance system, and (2) to develop models of swimmer detection systems for each port, configured for the protection of single ships and for groups of ships in established anchorage areas, based on the anticipated performance of the Swimmer Surveillance System S2705."
- (VIII-24) "A Study of Mine and Mine Countermeasures Operations in Guerrilla Warfare: Project PEBBLE (U)", Final Report No. NRC:MAC:2019, Volume II, from National Academy of Sciences, National Research Council Mine Advisory Committee, Washington, D. C., for Office of Naval Research, Washington, D. C., and Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. 2300(10) (March 1968), 501 pp (SECRET/NOFORN) (PA 32,728).
- (For annotation, see I-73.)
- (VIII-25) Mobley, J. O., "Antiswimmer Explosive Weapon Survey (U)", Report No. NOLTR 67-196 (AD 389 393), U. S. Naval Ordnance Laboratory, White Oak, Maryland (December 20, 1967) (CONFIDENTIAL) (PA 33,942).

(U) "This study investigates the various methods of repelling enemy swimmers by explosive means. The study of gun-type weapons was limited to those which could be mounted on small craft. Other means (torpedoes, boats, etc.) of delivering a charge to a located swimmer also were examined and the operational and physical characteristics of these and the gun-type weapons are listed and discussed. While the purpose of this report was to gather and present information relating to characteristics and costs of all explosive methods of deterring swimmers, it was possible to conclude that among the gun-type weapons a stabilized, mortar-like weapon would most nearly fit all the desired characteristics."

CONFIDENTIAL

- (VIII-26) Hawker, K. E., Jr., "Acoustic Detection of Swimmers (U)", Report No. DRL-TR-68-10 (AD 389 413 L), Defense Research Laboratory, The University of Texas at Austin, Austin, Texas (March 6, 1968) (CONFIDENTIAL) (PA 33,933).

(C) "This report is the response to a growing need for a broad survey of the problems associated with acoustic detection of swimmers. Particular emphasis is given to the case of unaided swimmers in harbor or harbor-like environments. An extended discussion of swimmer target strengths, including a literature review, is given for both scuba and non-scuba swimmers. The complex and important problems associated with the environment are discussed at length. As in the case of target strengths, the areas where insufficient knowledge of the environment exists at the present time are pointed out and lines of inquiry suggested. The primary purpose of the report is served by the concluding chapters relating the isolated target and environmental considerations to the problem of sonar design. A brief chapter discusses the application of Doppler sonar to the swimmer detection problem."

- (VIII-27) Heidelberg, Q. S., Jr., et al., "A Quick-Fix Development for Defense Against Swimmer Attack (U)", Report No. 348 (AD 389 470 L), U. S. Navy Mine Defense Laboratory, Panama City, Florida (March 1968) (CONFIDENTIAL) (PA 33,934).

(C) "This report documents the development of a quick-fix system for point defense against swimmer attack. The swimmer threat and swimmer tactics are discussed, and a concept of the system is described. The system comprises a floating platform with sonars, instrument shack and possibly a living shack, and an 81-mm Mark 2 Mod 0 mortar with modified rounds for swimmer neutralization. Several sonars were tested against swimmers in open bay and river environments. It was found that with favorable environmental conditions sonar could detect surface or underwater swimmers. The expected range is 100 to 200 yards with the smaller portable or semiportable sonars such as the Sea Scanar, AN/SQS-19, or Straza 500; with larger sonars such as the AN/UQS-1D, it is 300 to 400 yards. Thorough training of personnel is essential. Environmental factors affecting sonar detection are discussed, and the problem of interference between sonars operating close together is considered."

VIII-7 and VIII-8

CONFIDENTIAL

CONFIDENTIAL

SECTION IX

SHALLOW WATER SONAR AND ACOUSTICS (U)

CONFIDENTIAL

CONFIDENTIAL

(This page is Unclassified)

SECTION IX

SHALLOW WATER SONAR AND ACOUSTICS (U)

As stated in the Introduction, quarterly reports of the Defense Research Laboratory, University of Texas at Austin, have been omitted from this bibliography.

- (IX-1) Bottoms, Albert M., "A Survey of River Mine Countermeasures for Use in Remote Area Conflict, A Preliminary Report (U)", Research Analysis Corporation, for the Advanced Research Projects Agency, Office of Secretary of Defense, Contract No. SD-212, ARPA Cont. No. 10020, RAC 63-2791 (November 15, 1963) (SECRET) (PA 5434).

(For annotation, see I-4.)

- (IX-2) Bottoms, A. M., and Seawright, J. W., "Riverine Mine Countermeasures in Vietnam - 1964 (U)", Report No. E-80, from Joint Advanced Research Projects Agency/Navy Mobile Technical Analysis Team (MCM), and Research Analysis Corporation, McLean, Virginia, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C., Contract No. SD-212 (April 15, 1964) (CONFIDENTIAL) (PA 7742).

(For annotation, see I-8.)

- (IX-3) Jones, J. L., "Theory and Results of Correlation Measurements of Acoustic Reflection From Lake, River and Ocean Bottoms", Report No. NOLTR-62-196 (AD 299 319), from U. S. Naval Ordnance Laboratory, White Oak, Maryland (November 8, 1962), 107 pp (UNCLASSIFIED) (PA 12,966).

(U) "The results of measurements of reflection coefficients carried out by a novel correlation technique over the frequency range from 200 to 3200 cps are presented. The method is predicated upon the fact that the reflected field can be accounted for with good accuracy over the range of parameters of interest by an image whose amplitude and phase are determined by the Rayleigh plane-wave reflection coefficient. Confirmation of this is provided by numerical integration of the integral representing the exact expression for the reflected field together with a steepest-descents approximation of this integral. Measurements of bottom velocity and density just below the interface corroborate the reflection coefficient values..."

CONFIDENTIAL

CONFIDENTIAL

- (IX-4) Daly, E. F., "Evaluation of Minneapolis Honeywell Model 1B Sea Scanar (Small Boat Sonar) (U)", Report No. NAVEODFAC-126 (AD 356 997 L), from U. S. Naval Explosive Ordnance Disposal Facility, Indian Head, Maryland, for Department of the Navy, Bureau of Naval Weapons, Washington, D. C. (December 18, 1964), 25 pp (CONFIDENTIAL) (PA 13,382).

(C) The Sea Scanar was tested against moored and ground mines. Results were good against moored mines but poor against ground mines.

- (IX-5) "Advanced Research Projects Agency Long Range Program for a Riverine Sonar; Proposal of (U)", from Navy Mine Defense Laboratory, Panama City, Florida, for Director, Advanced Research Projects Agency, Washington, D. C. (March 16, 1965) (CONFIDENTIAL) (PA 15,346).

(U) This report describes a proposed riverine sonar which the NMDL was prepared to develop under ARPA sponsorship.

- (IX-6) Barnard, G. R., and McCormack, K., "Propagation Through Thermoclines at Mine-Hunting Frequencies (U)", Report No. 236 (AD 355 579), from The University of Texas, Defense Research Laboratory, Austin, Texas, for Department of the Navy, Bureau of Ships, Washington, D. C., Contract No. NObSr-72627 (December 7, 1964) (CONFIDENTIAL) (PA 15,450).

(C) "The degradation of sonar performance when thermoclines are present is discussed qualitatively and quantitatively. Transmission coefficients are calculated using a simple layered model that assumes average acoustic properties for the inhomogeneous layer, and are compared to coefficients calculated using a more general solution for a variable index of refraction. Transmission coefficient amplitudes and refraction angles are compared for several angles of incidence. The method of determining an expression for the velocity profile is discussed, along with the details of the transmission coefficient calculation. For several years it has been observed that in shallow-water mine-hunting operations thermal variations in the water have degraded sonar performance. In some instances, conditions have been so severe as to prohibit operation entirely. This report is an attempt to quantitatively describe the effects for several water conditions, assuming that narrow-beam transducers are used at mine-hunting sonar frequencies..."

- (IX-7) Simpson, I. C., "Quick Fix (NEL Problem E4135) (AN/SQS-37(XN-1)) (U)", Report No. 116, from U. S. Navy Electronics Laboratory, San Diego, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (April 8, 1965), 5 pp (CONFIDENTIAL) (PA 16,803).

CONFIDENTIAL

CONFIDENTIAL

(IX-7) (Cont'd) (C) "...This work was the result of the report and recommendations of a special three-man team which had been sent to South Viet Nam (sponsored by ARPA) to investigate the requirements for Riverine Mine Countermeasures...One of their major recommendations was that the AN/PQS-1 sonar (developed by NEL) be modified to perform as a portable mine hunting sonar to aid river craft in traversing mined rivers and canals. For the sake of expediency, ARPA and Navy personnel requested that NEL consider assuming responsibility for the sonar modification because of their familiarity with the sonar and the problem..."

(IX-8) "Report of Status Under Riverine Mine Hunting Sonar Task (U)", Communication from R. Cousins, Acting Commanding Officer and Director, U. S. Navy Defense Laboratory, Panama City, Florida, to Chief, Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (July 20, 1965) (CONFIDENTIAL) (PA 17,874).

(U) This is a final report on the "quick fix" task of NMDL to solve the river mine detection problem.

(IX-9) "AN/SQS-37 (XN) Sonar (U)", Serial No. 6068, from Director, Joint Research and Test Activity, APO, San Francisco, California 96309, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (August 31, 1965), 3 pp (CONFIDENTIAL) (PA 18,659).

(C) The AN/SQS-37 (XN) sonar was evaluated for its capability to detect VC mines. The sonar was found to be inadequate.

(IX-10) Rieke, Norbert A., Dunning, Bruce B., and Quynh, Pham-Ngoc, "Riverine Mine Hunting and Sweeping Equipment (U)", Final Report (AD 368 020), from Republic of Vietnam Armed Forces, Combat Development Test Center, Vietnam, and Advanced Research Projects Agency, R&D Field Unit-Vietnam, APO 143, San Francisco, California, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (October 1, 1965), 139 pp (CONFIDENTIAL) (PA 19,502).

(For annotation, see IV-18.)

(IX-11) "Navy Mine Defense Laboratory Comments on Joint Research and Test Activity Report on Riverine Sonar; Forwarding of (U)", from Commanding Officer and Director, U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Office of the Secretary of Defense, Director, Advanced Research Projects Agency, Washington, D. C. (December 29, 1965), 3 pp (CONFIDENTIAL) (PA 19,957).

(C) NMDL comments that it is unlikely that a riverine sonar with the JRATA-listed desirable characteristics can ever be developed.

CONFIDENTIAL

- (IX-12) Pike, Jerry W., "Development of the AN/SQS-37(XN) Riverine 'Quick Fix' Sonar (U)", Report No. 265, from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Office of the Secretary of Defense, Advanced Research Projects Agency, Project AGILE, Washington, D. C. (August 1965), 47 pp (CONFIDENTIAL) (PA 21,089).

(C) The report describes the results of a program to provide a sonar to detect VC mines in the inland waterways of the RVN. It was not judged successful by the users.

- (IX-13) McLeroy, E. G., "A Brief Analysis of the Effect of Suspended Solid Particles on Sonar Performance in Very Shallow Water", Interim Report No. i-100, from U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Bureau of Ships, Washington, D. C. (March 1966), 22 pp (UNCLASSIFIED) (PA 21,223).

(U) "The...report presents results of a brief theoretical examination of the possible effects of suspended particles on sonar propagation in shallow water. No new theory is developed. Calculations from available theory indicate that the performance of sonars will be degraded if a high concentration of particulate matter is present. This degradation results from both attenuation and refraction of the sonar beam..."

- (IX-14) "Project PEBBLE. Mine and Mine Countermeasures Operations in Guerrilla Warfare. Volume III: Bibliography (U)", Final Report No. NRC:MAC:2019 (AD 371 950 L), from National Academy of Sciences, National Research Council, Mine Advisory Committee, Project PEBBLE Study Group, Washington, D. C. (March 1966) (CONFIDENTIAL) (PA 22,032).

(For annotation, see I-21. See also I-20 and I-73.)

- (IX-15) "Conduct an Operational Evaluation of a Transistorized Hand-Held Object Locator AN/PQS-1 (XN-2) (U)", Final Report (AD 367 846 L), from Commander, Naval Operational Test and Evaluation Force, Norfolk, Virginia, for Department of the Navy, Office of Naval Operations, Washington, D. C. (January 6, 1961), 37 pp (CONFIDENTIAL) (PA 23,792).

(C) "The AN/PQS-1 (XN-2) is a portable, self-contained equipment designed to be used by underwater swimmers in locating underwater objects. The equipment is a transistorized version of the...hand-held object locator AN/PQS-1 (XG-1). The two equipments are essentially alike except that certain circuitry improvements and modifications are made to the transistorized version for better performance, increased efficiency, interchangeability of components, use of flashlight batteries and the incorporation of an acoustic marker listening feature."

CONFIDENTIAL

(This page is Unclassified)

- (IX-16) "Introduction to Sonar Technology", Report No. NAVSHIPS-0967-129-3010, from Department of the Navy, Bureau of Ships, Washington, D. C. (December 1965), 228 pp (UNCLASSIFIED) (PA 24,473).

(U) "The effort expended in the area of Sonar Technology has grown considerably during the past twenty-five years. However, documents covering the knowledge accumulated on sonar technology have not kept up with the work done. This document...is the outgrowth of an indoctrination program for new employees who were to begin working in the area of anti-submarine warfare at the Bureau of Ships. While not intended as a basic reference document for the design of sonar systems, it is hoped that this publication will serve to highlight the significant areas with which the worker must be concerned if he is to participate in the further advancement of sonar technology..."

- (IX-17) Stripling, M. H., "Bottom Sediments in Important Ship Channels of Europe and Asia (U)", Report No. 115, from Department of the Navy, Bureau of Ships, Minesweeping Branch, Washington, D. C. (February 1, 1959) (SECRET) (PA 25,061).

(For annotation, see III-14.)

- (IX-18) "A Handbook of U. S. Naval Systems and Operations (U)", Report No. ONR-ACR-NAR-30, from Department of the Navy, Office of Naval Research, Naval Analysis Group, Washington, D. C. (June 1965) (SECRET/NOFORN) (PA 25,120).

(For annotation, see I-33.)

- (IX-19) Waldie, R. L., Good, D. E., and Simpson, I. C., Jr., "AN/PQS-1(XG-1) Diver Held Sonar", Report No. 936 (AD 223 193 L), from U. S. Navy Electronics Laboratory, San Diego, California, for Department of the Navy, Bureau of Ships, Washington, D. C. (December 10, 1959), 24 pp (UNCLASSIFIED) (PA 25,212).

(U) The problem given the authors was to "...develop a simple, reliable, lightweight, sonar equipment capable of detecting objects of ground-mine size at ranges up to 100 yards. The sonar is to be carried by swimmers or divers and capable of being used to depths of 120 feet."

- (IX-20) Zehner, William J., Sr., Bennett, Donald F., and Baker, Harry J., "Tests of a Sonic Doppler Swimmer Detection Device (U)", Report No. 287 (AD 374 706 L), from Department of the Navy, Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Commander, Naval Ship Systems Command, Washington, D. C., Contract No. N600(61331)60822 (July 1966), 38 pp (CONFIDENTIAL) (PA 25,998).

IX-5

CONFIDENTIAL

CONFIDENTIAL

(IX-20) (Cont'd) (C) "Results of this study indicate that swimmers could be detected at short ranges under good sea conditions, but that reliable detection at ranges beyond 100 feet was still limited by the available signal-to-noise ratio. This limitation is inherent in a CW-type sonar of the present electronic configuration and is primarily due to reverberation for the medium boundaries. These reverberation signals have characteristics similar to swimmer doppler signals. The tests revealed no simple method for distinguishing between swimmer doppler signals and background noise."

(IX-21) "Acoustic Guidance for a Mine Neutralization Vehicle (U)", Report No. 3153 (AD 374 875 L), from Aerojet-General Corporation, Von Karman Center, Oceanic Products Division, Azusa, California, for U. S. Mine Defense Laboratory, Panama City, Florida, Contract No. N600(61331)-63318 (March 1966) (CONFIDENTIAL) (PA 26,001).

(For annotation, see IV-43.)

(IX-22) Marley, Shyne B., and Denton, Robert W., "Defense Against Underwater Swimmer Attack (U)", U. S. Navy Mine Defense Laboratory, Panama City, Florida, 6 pp (SECRET) (PA 26,096).

(For annotation, see VIII-11.)

(IX-23) Burgener, R. C., "A Survey of Methods for Detection of Swimmers, Sound, and Small Boats (U)", Report No. R-633, from Battelle Memorial Institute, RACIC, Columbus, Ohio, for Airtronics, Inc., Washington, D. C. (August 25, 1966), 16 pp (SECRET/NOFORN) (PA 29,415).

(For annotation, see I-48.)

(IX-24) Koesy, C. B., et al., "An Assessment of Sonar for the Riverine Environment (U)", Interim Report No. i-113 (AD 378 920 L), from U. S. Navy Mine Defense Laboratory, Panama City, Florida (January 1967), 62 pp (CONFIDENTIAL) (PA 29,685).

(C) "...A small sonar is needed for installation on small boats engaged in riverine mine countermeasures operations. The mining threat consists primarily of small mines, which are moored a few feet below the surface in rivers and canals and fired by means of control wires from concealed locations near the banks. The sonar must detect such mines but may also be required to detect bottom mines and larger mines in rivers and river approaches, which are to be marked with small buoys for subsequent neutralization..."

(IX-25) "Evaluate the AN/SQS-19 Mine Detecting Set (U)", Final Report (AD 368 827 L), from Department of the Navy, U. S. Naval Operational Test and Evaluation Force, Norfolk, Virginia, for Chief of Naval Operations, Washington, D. C. (June 24, 1960), 49 pp (CONFIDENTIAL) (PA 30,156).

CONFIDENTIAL

- (IX-25) (Cont'd) (C) "The AN/SQS-19 Mine Detecting Set is an over-the-side mounted, lightweight mine detecting sonar developed by Navy Electronics Laboratory, San Diego, California, and manufactured by EDO Corporation, College Point, Long Island. The AN/SQS-19 is designed to transmit at continuous changing frequency. This report presents the results of tests conducted by the Key West Test and Evaluation Detachment from 3 November 1958 to 30 October 1959 in the Key West and Panama City, Florida areas. Tests were conducted to determine the suitability of the AN/SQS-19 (XN-1) Mine Detecting Set for use as a mine hunting sonar and in harbor defense operations against midget submarines and surface sneak craft."
- (IX-26) "U. S. Navy Research and Development Unit First Semi-Annual Progress Report (U)", from Department of the Navy, Navy Research and Development Unit, Vietnam, for Office of the Secretary of Defense, Advanced Research Projects Agency, Washington, D. C. (July 1, 1967), 39 pp (SECRET) (PA 30,381).
- (For annotation, see I-50.)
- (IX-27) "U. S. Navy Symposium on Military Oceanography. The Proceedings of the Symposium. Volume I (11-13 May 1966) (U)" (AD 376 894), from U. S. Navy Electronics Laboratory, San Diego, California (1966), 398 pp (CONFIDENTIAL) (PA 31,341).
- (U) There are a number of papers in these proceedings of interest, specifically on sonar for inland waterway use and on shallow water amphibious operations.
- (IX-28) Pike, J. W., et al., "Riverine Evaluation of the AN/SQS-19 and Straza 500 Sonars (U)", Final Report No. 332 (AD 383 486 L), from Department of the Navy, U. S. Navy Mine Defense Laboratory, Panama City, Florida, for Department of the Navy, Commander, Naval Ship Systems Command, Washington, D. C. (June 1967), 58 pp (CONFIDENTIAL) (PA 31,546).

(C) "To meet the need of operating forces, COMNAVFORV set forth the following requirements for development of sonars to detect mines in a riverine environment: (1) Suitability for mine hunting in Vietnam and Vietnamese and U. S. small craft, such as MSB, MLMS, LCM, STCAN, and PCF; (2) Capability of search and detection in [inland] waterways ranging from 2 to 25 meters in depth and 40 to 1000 meters wide; (3) Capability of detecting, at a range of 400 yards, truncated cone mines with total surface area of approximately 900 square inches and spherical mines 22 inches in diameter, both types steel encased and either moored or bottom laid; (4) Detection probability of 50 percent at 400 yards at 15 knots; 80 percent at 300 yards at 6 knots; 100 percent at 100 yards at 6 knots; and (5) Aural and visual presentation to sonar operator. Direct range reading with 10 percent minimum resolution. Two small boat sonars, an AN/SQS-19 manufactured by General Instruments and a Straza 500 manufactured by Straza Electronics, were chosen for test and evaluation against U. S. and Viet Cong (VC) mines."

IX-7

CONFIDENTIAL

CONFIDENTIAL

(This page is Unclassified)

(IX-29) Hawker, K. E., Jr., "Acoustic Detection of Swimmers (U)", Report No. DRL-TR-68-10 (AD 389 413 L), Defense Research Laboratory, The University of Texas at Austin, Austin, Texas (March 6, 1968) (CONFIDENTIAL) (PA 33,933).

(For annotation, see VIII-26.)

IX-8

CONFIDENTIAL

UNCLASSIFIED

DISTRIBUTION LIST

Department of Defense

Director
Advanced Research Projects Agency
Office of the Secretary of Defense
Washington, D. C. 20301
Attention Project AGILE

(2)

Defense Intelligence Agency
Department of Defense
Washington, D. C. 20301

Advanced Research Projects Agency
Office of the Secretary of Defense
Washington, D. C. 20301
Attention Mr. F. A. Koether
Director, Technical Information
Room 2B 261 (1)
CDR A. L. O'Toole, USN
Room 3D 160 (1)

Defense Documentation Center
Cameron Station
Alexandria, Virginia 22314 (20)

Director
OSD/ARPA R&D Field Unit
APO San Francisco 96243

Deputy Director (Tactical Warfare
Programs)
Office of the Director of Defense
Research and Engineering
Department of Defense
Washington, D. C. 20301

Director
OSD/ARPA R&D Center
APO San Francisco 96346

Unified Commands

Commander in Chief Pacific
FPO San Francisco 96610

Commander in Chief
U. S. Southern Command
APO New York 09826

Commander
U. S. Military Assistance Command-
Vietnam
APO San Francisco 96222

Chief, Intelligence Division
Studies and Observations Group
HQ, U. S. Military Assistance
Command, Vietnam
APO San Francisco 96222
Attention LTC Peter Barretta, Jr.

UNCLASSIFIED

SECRET

UNCLASSIFIED
Security Classification

DOCUMENT CONTROL DATA - R&D		
(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)		
1. ORIGINATING ACTIVITY (Corporate author) RACIC, Battelle Memorial Institute Columbus Laboratories Columbus, Ohio 43201		2a. REPORT SECURITY CLASSIFICATION SECRET/NOFORN
		2b. GROUP 1
3. REPORT TITLE RIVERINE/INSHORE WARFARE (U) (A Selected, Annotated Bibliography)		
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Memorandum Report		
5. AUTHOR(S) (Last name, first name, initial) Patterson, William C., Jr.		
6. REPORT DATE March 1969	7a. TOTAL NO. OF PAGES 108	7b. NO. OF REFS 277
8a. CONTRACT OR GRANT NO. Contract No. F33657-67-C-0810 ✓	8a. ORIGINATOR'S REPORT NUMBER(S) RACIC-MR-2 ✓	
b. PROJECT NO. c. d.	8b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
10. AVAILABILITY/LIMITATION NOTICES In addition to security requirements which apply to the document and must be met, each transmittal outside the agencies of the U. S. Government must have prior approval of ARPA/TIO.		
11. SUPPLEMENTARY NOTES		12. SPONSORING MILITARY ACTIVITY Advanced Research Projects Agency Office of the Secretary of Defense Washington, D. C. 20301
13. ABSTRACT (U) Citations and annotations for 277 selected documents on riverine/inshore warfare and peripheral subjects are given. The bibliography is subdivided into the following sections: historical aspects; the riverine environment; mine warfare in inland/inshore waters; inshore operations; junks and sampans; small craft (Western types); swimmer attacks; and shallow water sonar and acoustics.		

DD FORM 1473
1 JAN 64

SECRET

UNCLASSIFIED
Security Classification

